RENAULT

1 Engine and peripherals

10A ENGINE AND CYLINDER BLOCK ASSEMBLY

11A TOP AND FRONT OF ENGINE

12A FUEL MIXTURE

12B TURBOCHARGING

13A FUEL SUPPLY

13B DIESEL INJECTION

13C PREHEATING

14A ANTIPOLLUTION

16A STARTING - CHARGING

17A IGNITION

17B PETROL INJECTION

X79

NOVEMBER 2009 **EDITION ANGLAISE**

"The repair procedures given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The procedures may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which the vehicles are constructed".

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19A COOLING

19B EXHAUST

19C TANK

19D ENGINE MOUNTING

X79

NOVEMBER 2009 **EDITION ANGLAISE**

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DUSTER - Chapitre 1

Contents

Pages

10A ENGINE AND CYLINDER BLOCK ASSEMBLY

Crankshaft seal on timing end: Removal - Refitting 10A-1

Crankshaft seal, gearbox end: Removal - Refitting 10A-5

Lower cover: Removal - Refitting 10A-9

Conrod bearing shell: Removal - Refitting 10A-24

Engine oil: Draining - Refilling 10A-32

Oil filter: Removal - Refitting 10A-34

Oil-coolant heat exchanger: Removal - Refitting 10A-37

Oil pressure sensor: Removal - Refitting 10A-42

Oil pump: Removal - Refitting 10A-44

Oil pressure: Check 10A-46

Multifunction support: Removal - Refitting 10A-48

Engine - gearbox assembly: Removal - Refitting 10A-54

Flywheel: Removal - Refitting 10A-75

11A TOP AND FRONT OF ENGINE

Pressure at end of compression: Check 11A-1

Accessories belt: Removal - Refitting 11A-2

Crankshaft accessories pulley: Removal - Refitting 11A-10

Timing belt: Removal - Refitting 11A-17

Rocker cover: Removal - Refitting 11A-42

Camshaft: Removal - Refitting 11A-49

Camshaft seal, timing end: Removal - Refitting 11A-56

Oil decanter: Removal - Refitting 11A-68

12A FUEL MIXTURE

Air inlet: Description 12A-1

Air resonator: Removal - Refitting 12A-2

Air filter: Removal - Refitting 12A-3

Air filter unit: Removal - Refitting 12A-6

Air flowmeter: Removal - Refitting 12A-10

Contents

12A FUEL MIXTURE

Throttle valve: Removal - Refitting 12A-11

Inlet distributor: Removal - Refitting 12A-12

Injector holder shim: Removal - Refitting 12A-14

Exhaust manifold: Removal - Refitting 12A-16

12B TURBOCHARGING

Turbocharger: Removal - Refitting 12B-1

Turbocharger oil pipe: Removal - Refitting 12B-4

Intercooler: Removal - Refitting 12B-8

13A FUEL SUPPLY

Fuel circuit: Operating diagram 13A-1

Manual priming pump: Removal - Refitting 13A-3

Diesel filter: Removal - Refitting 13A-5

Fuel pressure: Check 13A-9

Fuel flow: Check 13A-11

13B DIESEL INJECTION

Diesel injection: List and location of components 13B-1

Diesel injection computer: Removal - Refitting 13B-5

Camshaft position sensor: Removal - Refitting 13B-7

13B DIESEL INJECTION

Crankshaft position sensor: Removal - Refitting 13B-8

High pressure pump: Removal - Refitting 13B-9

Flow actuator: Removal - Refitting 13B-14

Venturi: Removal - Refitting 13B-16

High pressure pipe: Check 13B-18

High pressure pipe between pump and rail: Removal - Refitting 13B-19

High pressure pipe between rail and injector: Removal - Refitting 13B-22

Injector rail: Removal - Refitting 13B-25

Fuel temperature sensor: Removal - Refitting 13B-28

Injector leak flow: Check 13B-30

Diesel injector: Removal - Refitting 13B-32

Accelerometer: Removal - Refitting 13B-37

13C PREHEATING

Pre-postheating unit: Removal - Refitting 13C-1

Heater plugs: Removal - Refitting 13C-2

14A ANTIPOLLUTION

Exhaust gas recirculation: List and location of components 14A-1

Fuel vapour absorber: Removal - Refitting 14A-2

Contents

14A ANTIPOLLUTION

Exhaust gas recirculation solenoid valve: Removal - Refitting 14A-4

Exhaust gas cooler: Removal - Refitting 14A-7

Exhaust gas recirculation assembly: Removal - Refitting 14A-9

Exhaust gas recirculation rigid pipe: Removal - Refitting 14A-12

16A STARTING - CHARGING

Alternator: Removal - Refitting 16A-1

Starter: Removal - Refitting 16A-8

Alternator pulley: Removal - Refitting 16A-12

17A IGNITION

Coils: Removal - Refitting 17A-1

17B PETROL INJECTION

Petrol injection: List and location of components 17B-1

Oxygen sensors: Removal - Refitting 17B-4

Throttle valve potentiometer: Removal -Refitting 17B-6

Petrol injection computer: Removal - Refitting 17B-7

Crankshaft position sensor: Removal - Refitting 17B-9

Injector rail - Injectors: Removal - Refitting 17B-10

19A COOLING

Engine cooling system: Operating diagram 19A-1

Engine cooling system: Specifications 19A-2

Engine cooling system: Check 19A-3

Engine cooling circuit: List and location of components 19A-5

Cooling system: Draining - Refilling 19A-6

Cooling radiator: Removal - Refitting 19A-9

Coolant pump: Removal - Refitting 19A-13

Thermostat: Removal - Refitting 19A-19

Water chamber: Removal - Refitting 19A-22

Engine cooling fan assembly: Removal - Refitting 19A-27

Coolant pump inlet pipe: Removal - Refitting 19A-34

Expansion bottle: Removal - Refitting 19A-38

Coolant temperature sensor: Removal - Refitting 19A-40

19B EXHAUST

Exhaust: List and location of components 19B-1

Exhaust: Precautions for the repair 19B-6

Catalytic converter: Removal - Refitting 19B-10

Expansion chamber: Removal - Refitting 19B-17

Contents

19B EXHAUST

Intermediate pipe: Removal - Refitting 19B-18

Silencer: Removal - Refitting 19B-20

19C TANK

Fuel tank: Draining 19C-1

Fuel tank: Removal - Refitting 19C-3

Fuel level sensor module: Removal - Refitting 19C-8

19D ENGINE MOUNTING

Suspended engine mounting: Tightening torque 19D-1

Left-hand suspended engine mounting: Removal - Refitting 19D-2

Right-hand suspended engine mounting: Removal - Refitting 19D-4

Lower engine tie-bar: Removal - Refitting 19D-8

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

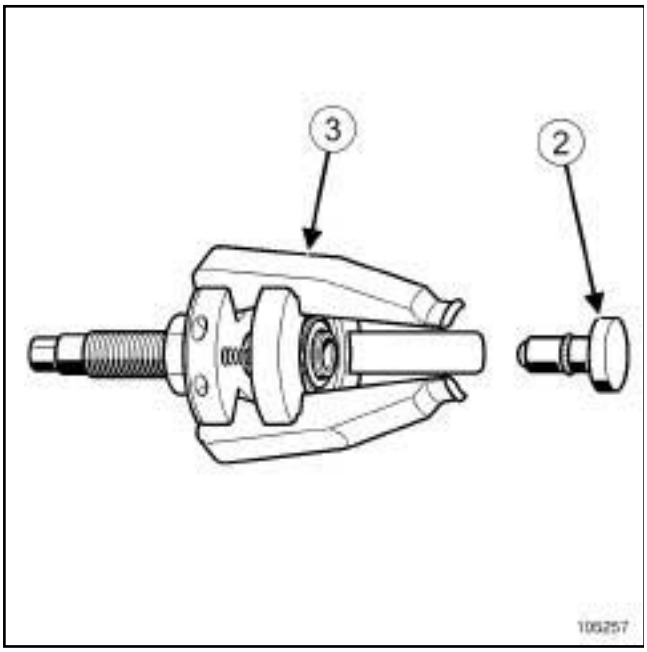
❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

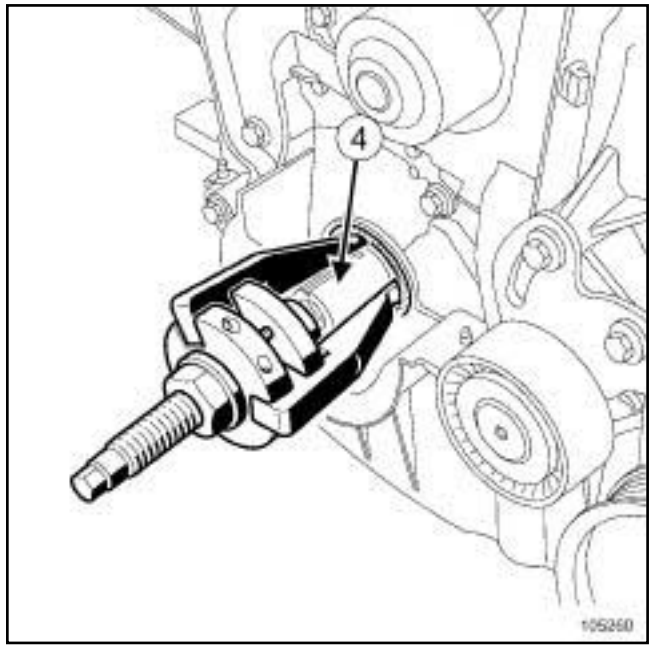
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the timing belt sprocket (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) .

II - REMOVAL OPERATION



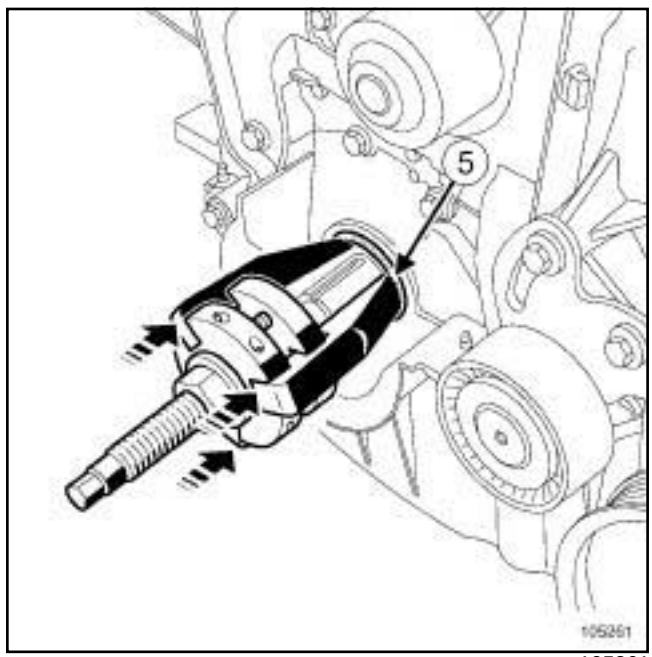
105257

❑ Fit the end piece (**2**) onto the tool (**3**) .



105260

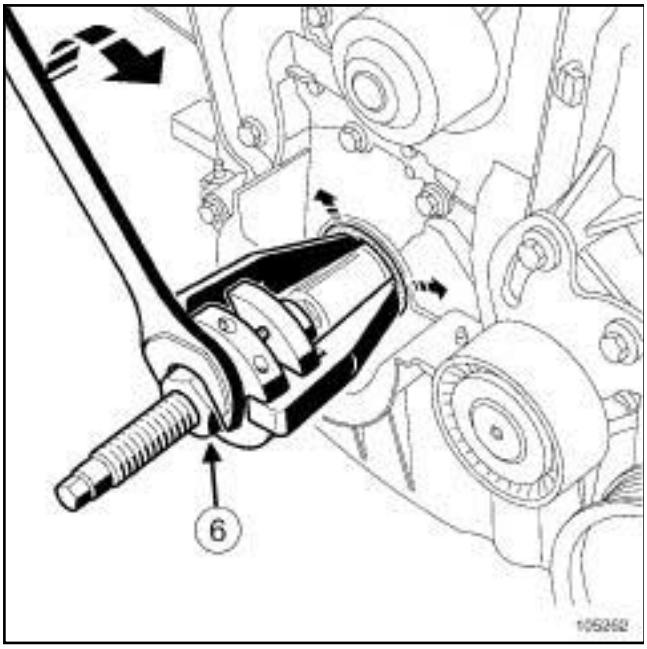
❑ Position the jaws of the toolonto the crankshaft nose (**4**) .



105261

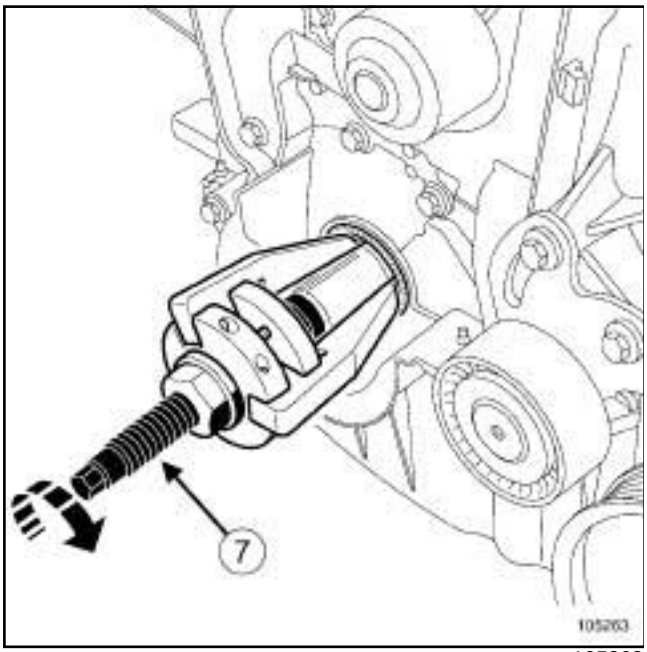
❑ Push on the tooluntil contact is made between the ends (**5**) of the jaws and the crankshaft seal.

K9K



105262

❑ Separate the jaws by screwing the nutof the tool (**6**) .



105263

❑ Screw down the threaded rod (**7**) of the.

❑ Refit the crankshaft seal at the timing end using the tool.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft seal on timing end**.

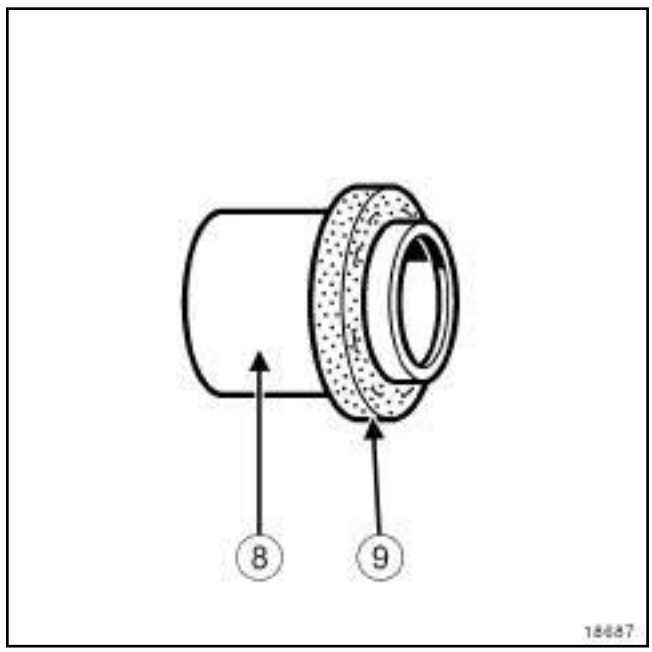
WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the crankshaft seal mating face,

- the crankshaft seal housing in the crankshaft closure panel.

II - REFITTING OPERATION



18687

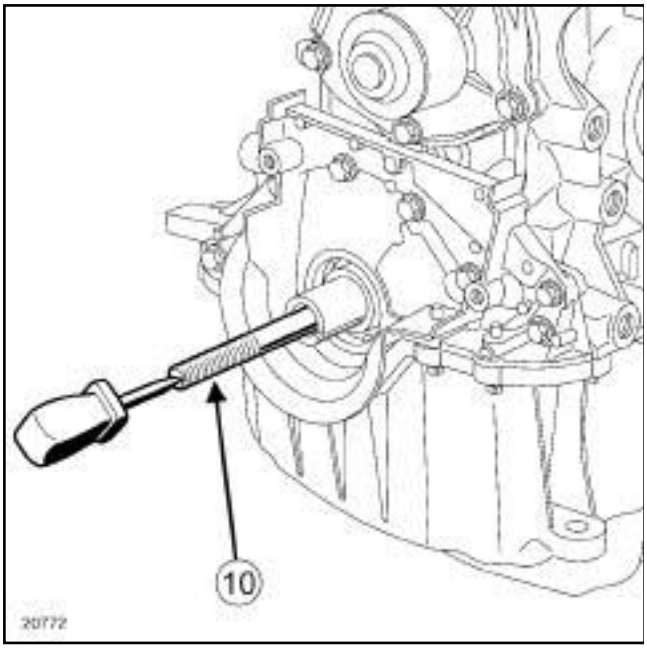
❑

Note:

This type of seal is extremely fragile.

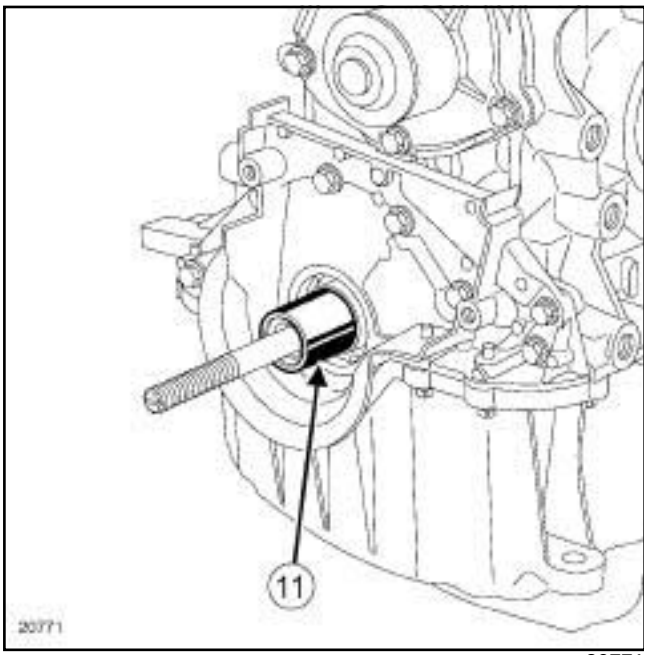
Only touch the protective part (**8**) when handling the gasket. It is strictly forbidden to touch the seal (**9**) ; this is to prevent any oil leaks once the oil seal is fitted to the engine.

K9K



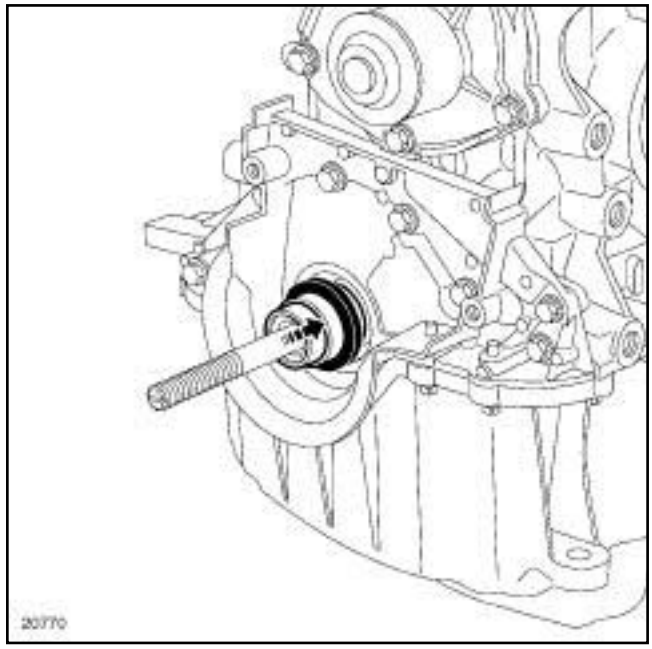
20772

❑ Screw the threaded rod (**10**) of theinto the crankshaft.



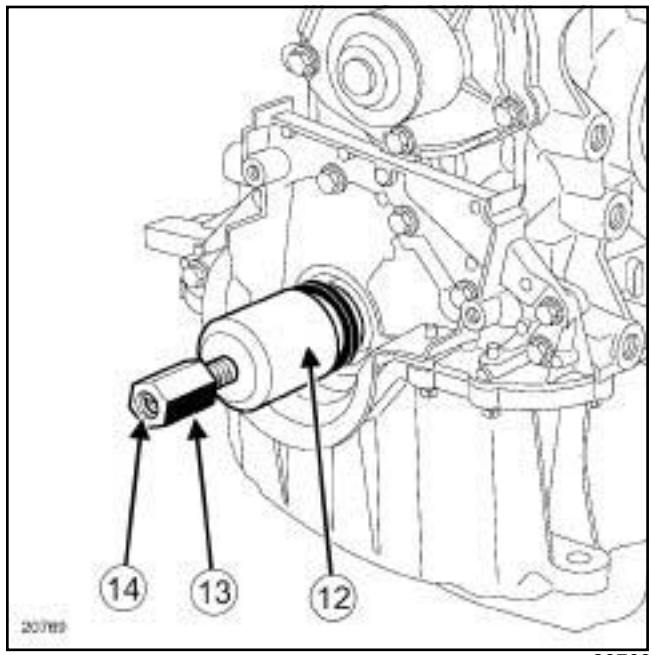
20771

❑ On the crankshaft, fit the spacer (**11**) of the.



20770

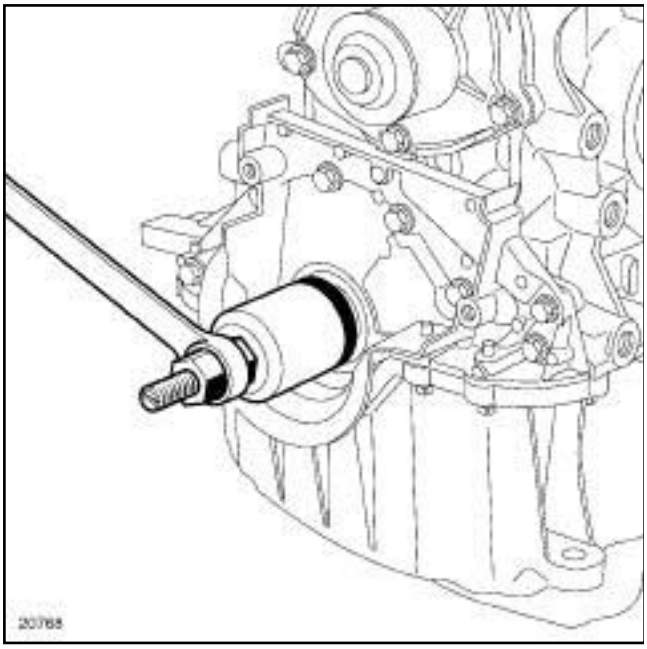
❑ Fit the protector with the new seal in place on the spacer, taking care not to touch the seal.



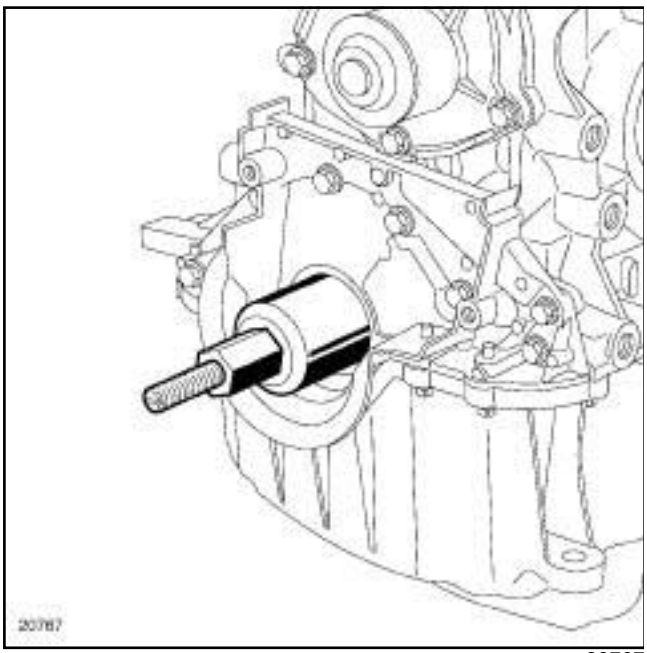
20769

❑ Fit the cover (**12**) and nut (**13**) (with the thread (**14**) of the nut towards the outside of the engine) of the.

K9K

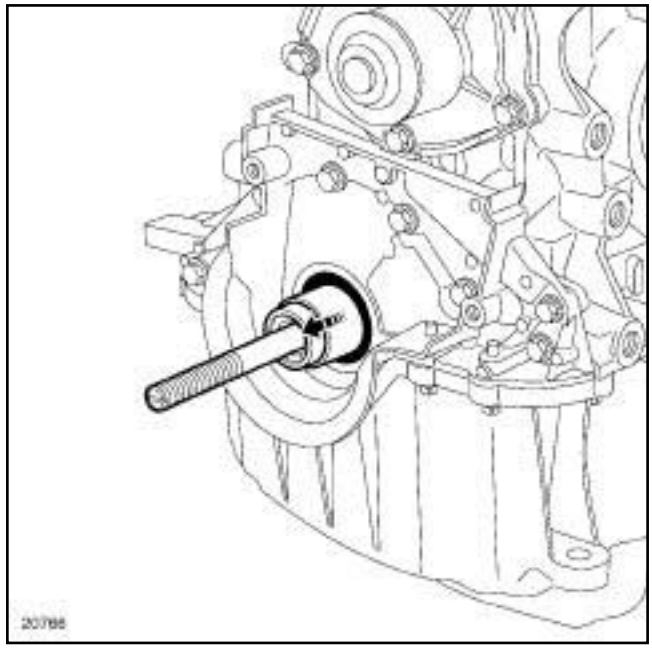


20768



20767

❏ Screw on the nut until the cover touches the spacer.



20766

❏ Remove the nut, the cup, the protector and the threaded rod.

III - FINAL OPERATION

❏ Refit:

- the timing belt sprocket (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M or K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

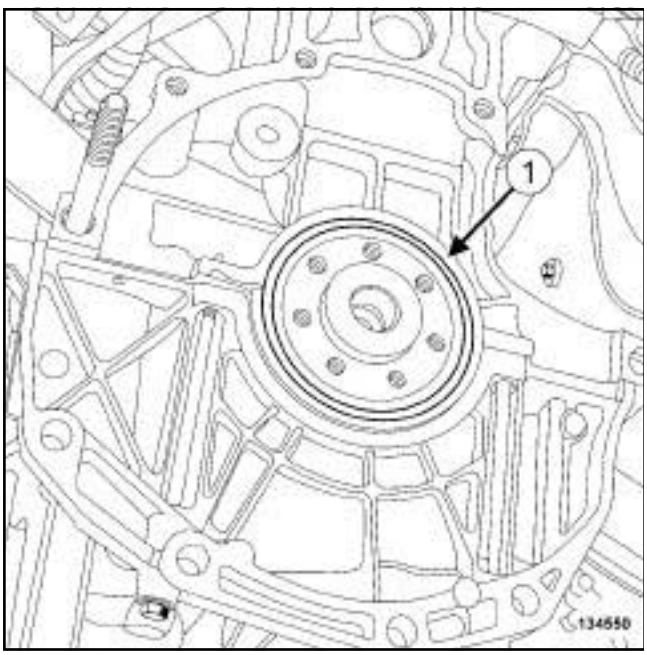
❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox),
- the clutch (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-75**) (20A, Clutch).

II - REMOVAL OPERATION

K4M



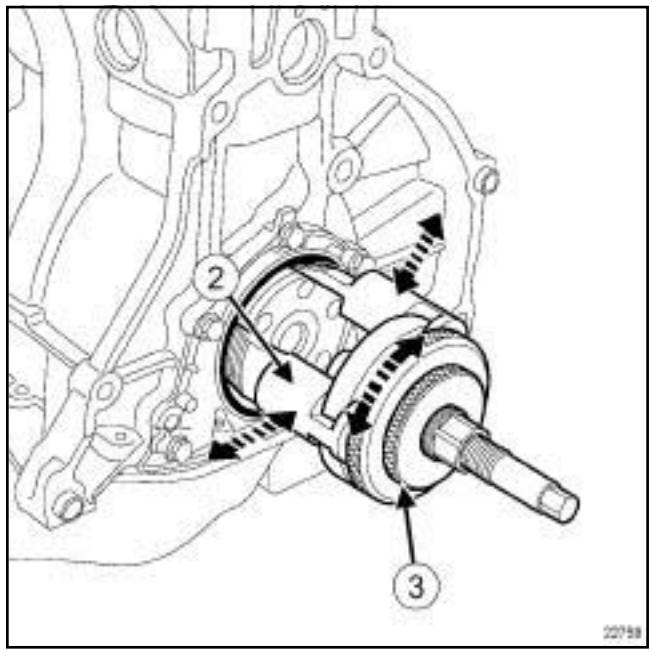
134550

❑ Remove the crankshaft seal (**1**) at the gearbox end using a screwdriver.

Note:

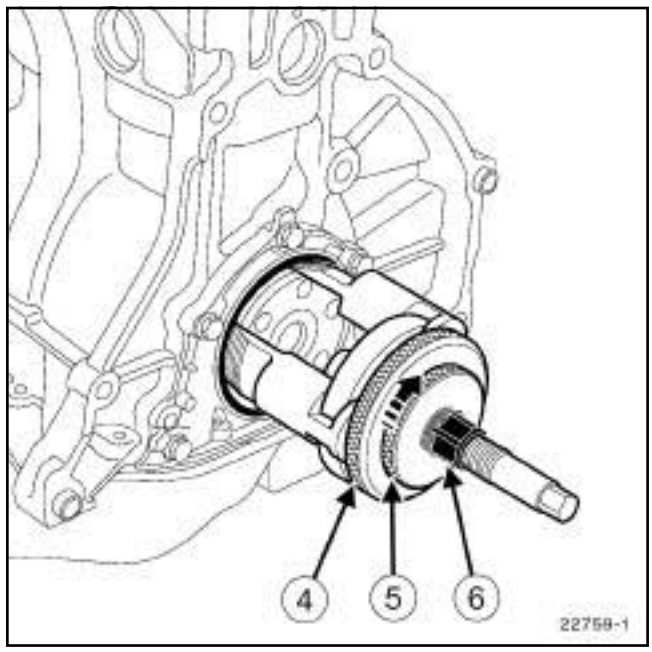
Take care not to damage the crankshaft mating face.

K9K



22759

❑ Fit the extractorto the shaft, adjusting the fingers (**2**) to the diameter of the shaft using the knurled plate (**3**) .

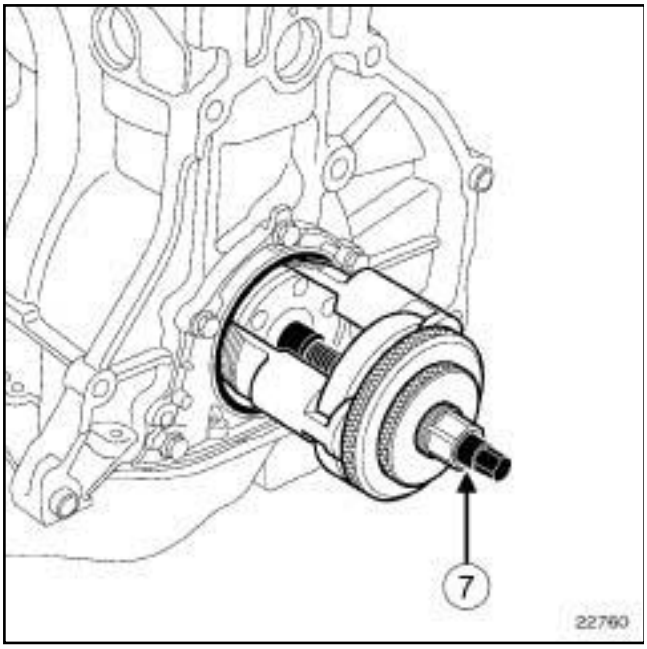


22759-1

❑ Screw knurled plate (**5**) until it is locked to knurled plate (**4**) to keep the fingers in position on the shaft.

❑ Screw the extractor into the seal using the hexagonal nut (**6**) .

K4M or K9K



22760

❑ Extract the crankshaft seal at the gearbox end by screwing the threaded rod (**7**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft seal on gearbox end**.

WARNING

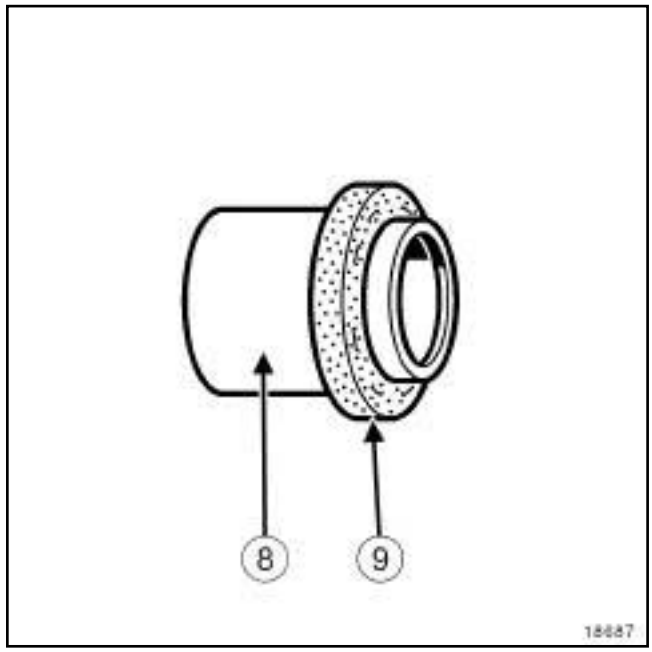
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the crankshaft seal mating face,
- the crankshaft seal housing on the cylinder block.

II - REFITTING OPERATION

K9K



18687

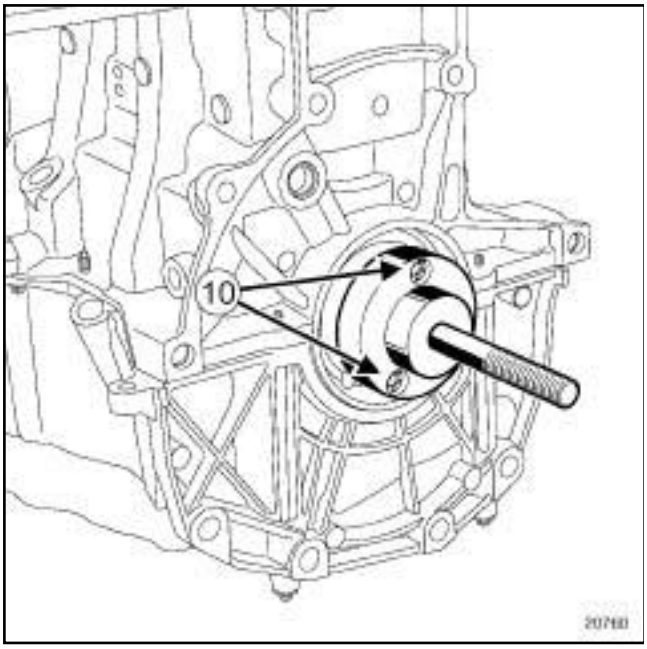
❑

Note:

This type of seal is extremely fragile.

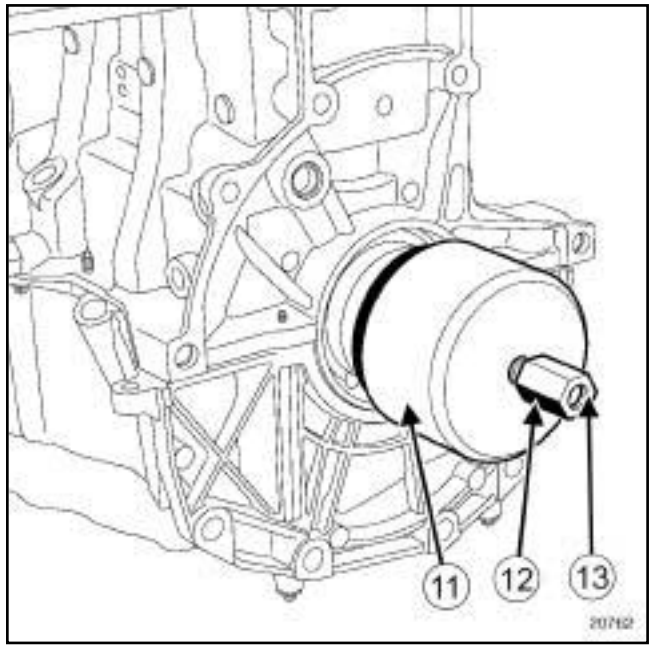
Only touch the protective part (**8**) when handling the gasket. It is strictly forbidden to touch the seal (**9**) ; this is to prevent any oil leaks once the oil seal is fitted to the engine.

K4M or K9K



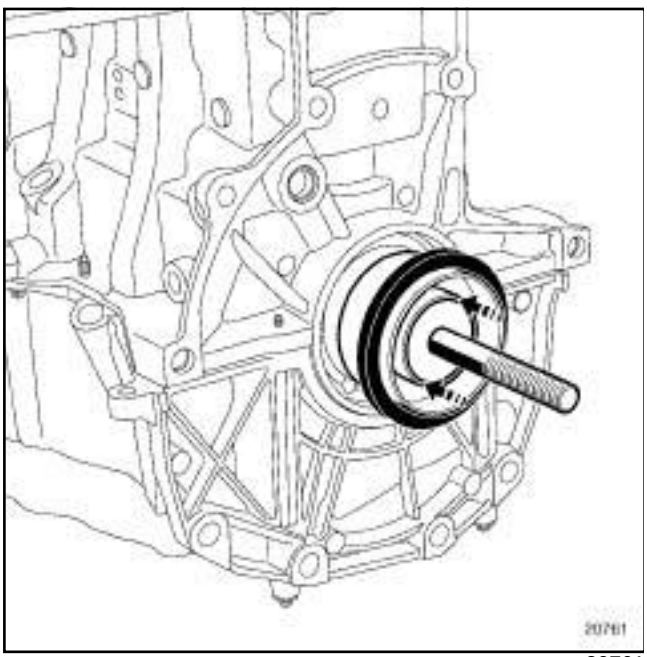
20760

❑ Mount theon the crankshaft, securing it using bolts (**10**) .



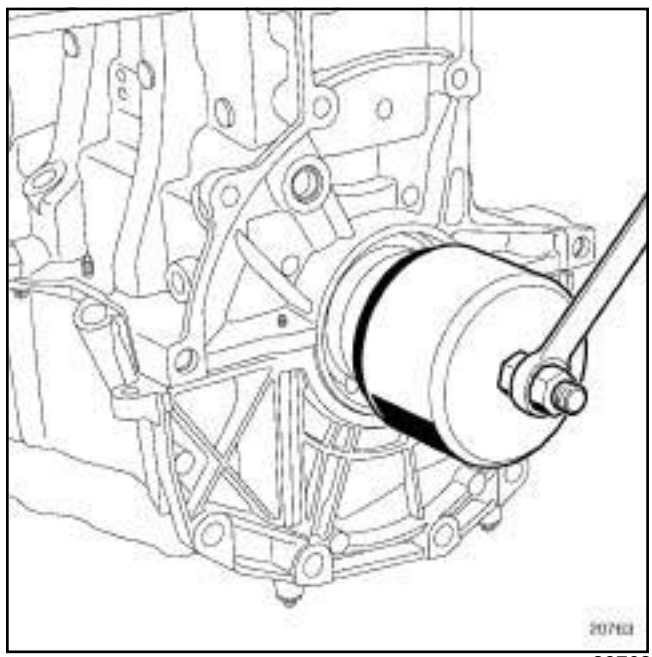
20762

❑ Fit the cover (**11**) and nut (**12**) (with the thread (**13**) of the nut towards the outside of the engine) of the.



20761

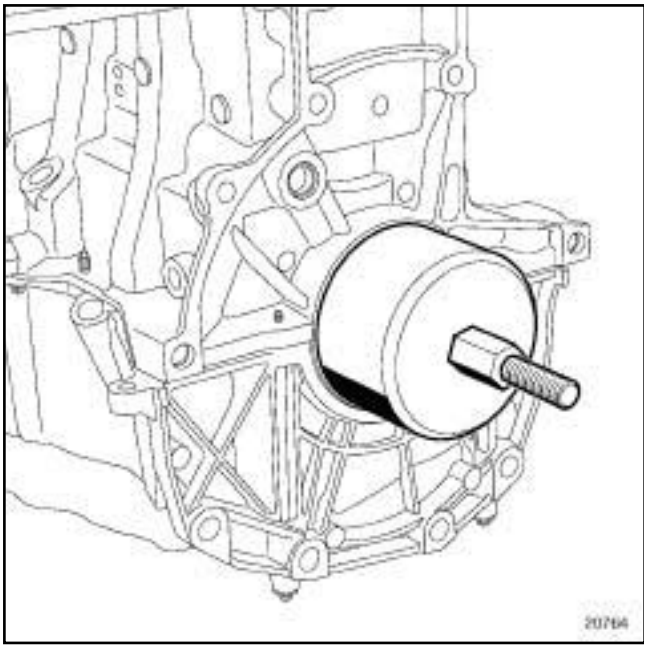
❑ Fit the protector with its seal in place on the, taking care not to touch the seal.



20763

❑ Tighten the nut until the cover touches the cylinder block.

K4M or K9K



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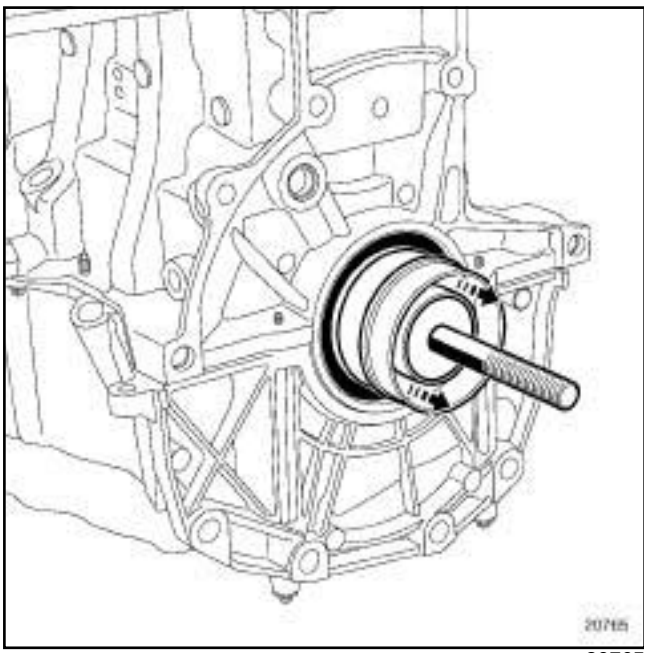
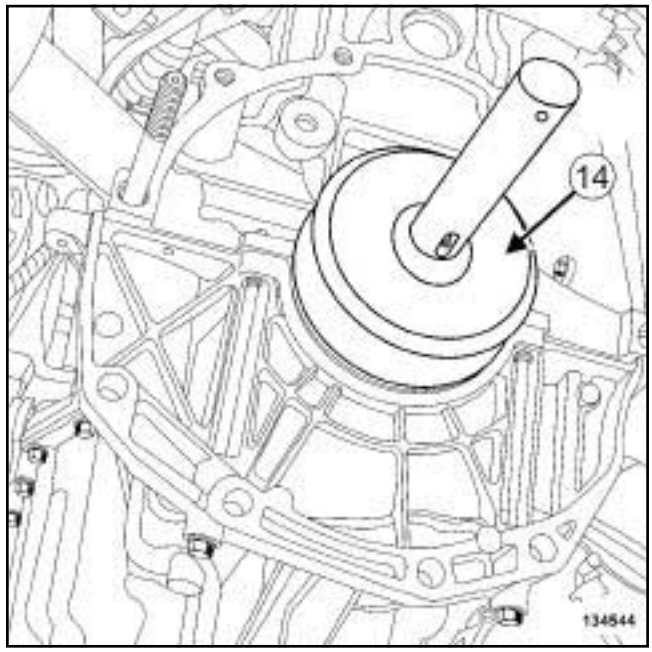


20765

❑ Remove the nut, the cover, the protector and the base plate.

K4M



134544

❑ Refit the crankshaft seal at the gearbox end, using the tool (**14**) .

III - FINAL OPERATION

❑ Refit:

- the flywheel (see **10A**, **Engine and cylinder block assembly**, **Flywheel: Removal - Refitting**, page **10A-75**) (20A, Clutch),
- the clutch (see **Pressure plate - Disc: Removal - Refitting**) (20A, Clutch),
- the gearbox (see **Manual gearbox: Removal - Refitting**) (21A, Manual gearbox).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Perform the following operations:

- fill the manual gearbox (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox),
- bleed the clutch control circuit (see **Clutch circuit: Bleed**) (37A, Mechanical component controls).

K9K

Special tooling required	
Tav. 1747	Threaded rods for carrying out subframe operations.

Tightening torques ▽	
oil pump bolts	**25 N.m**
sump bolts on the cylinder block	**14 N.m**
sump bolts on the gearbox	**44 N.m**
sump bolts on the multifunction support	**25 N.m**
power assisted steering pump support bolt on the sump	**25 N.m**
bracket bolts	**62 N.m**
relay bearing bolts	**44 N.m**
right-hand driveshaft flange bolt(s) on the relay bearing	**21 N.m**
front axle subframe tie-rod upper bolts	**21 N.m**
power-assisted steering low pressure pipe bolt on the front axle subframe	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55, Exterior protection).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

❏ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

❏ Remove:

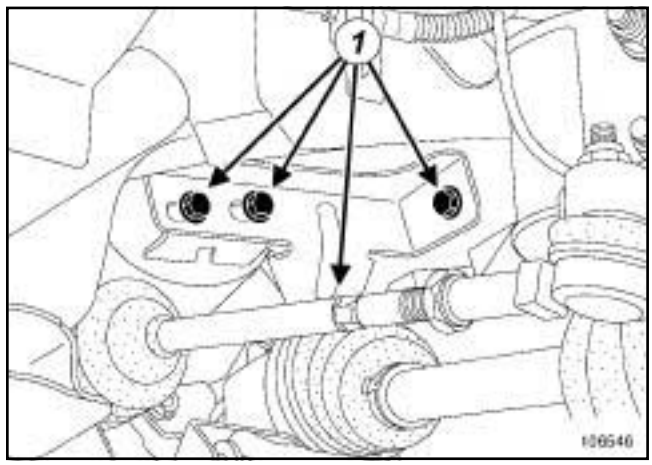
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch side liners,
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

❏ Extract the lower arm ball joints from the stub axle carrier (see **Front driveshaft lower arm: Removal - Refitting**) (31A, Front axle components).

❏ Remove (see **Steering box: Removal - Refitting**) (36A, Steering assembly):

- the heat shield bolts on the steering box,
- the steering box heat shield,
- the steering box bolts on the front axle subframe.

❏ Attach the steering rack to the body.

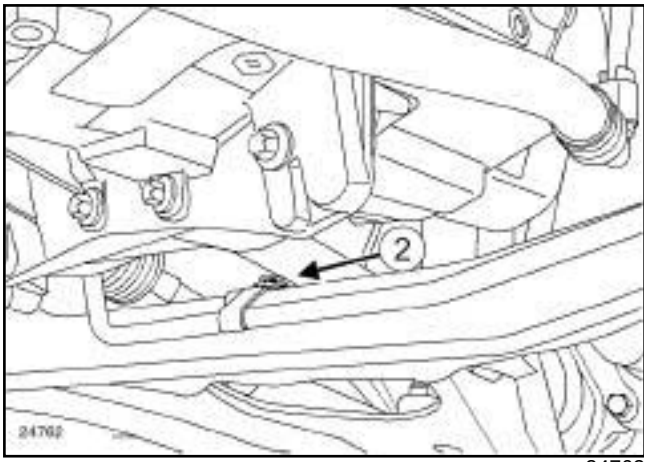


106546

❏ Remove:

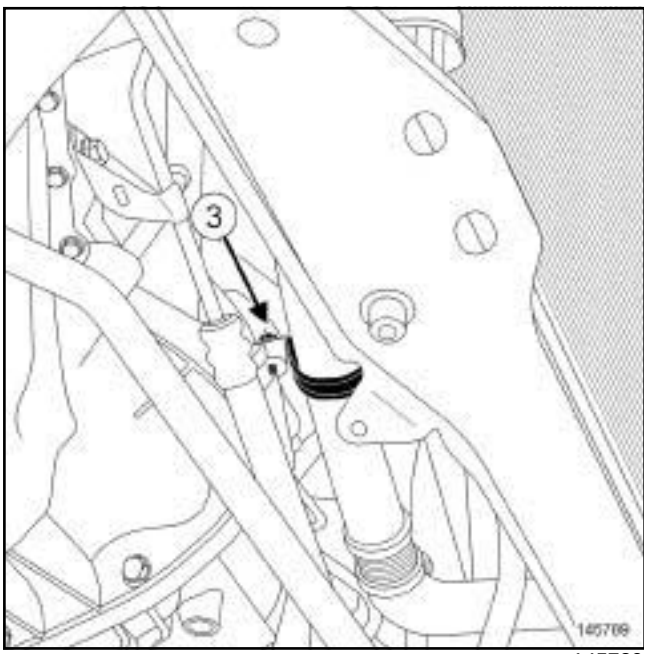
- the catalytic converter upstream strut bolts (**1**) ,
- the catalytic converter upstream strut.

K9K



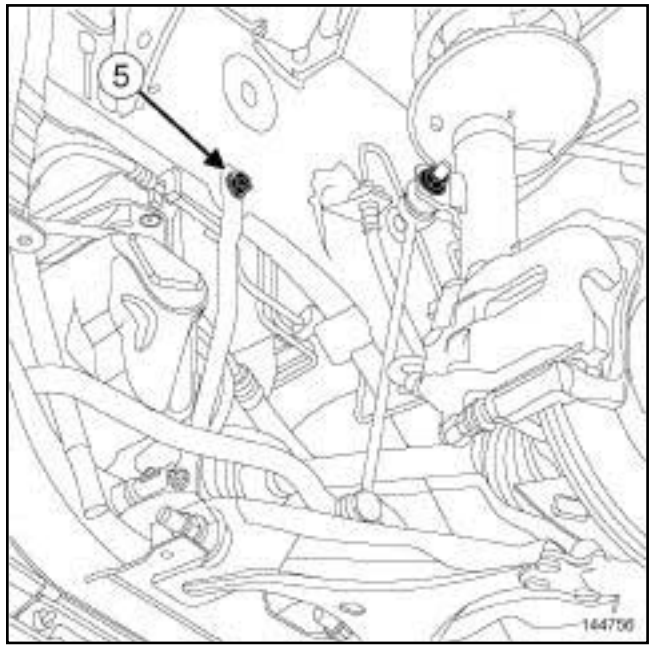
24762

❏ Remove the power-assisted steering low pressure pipe bolt (**2**) on the front axle subframe.



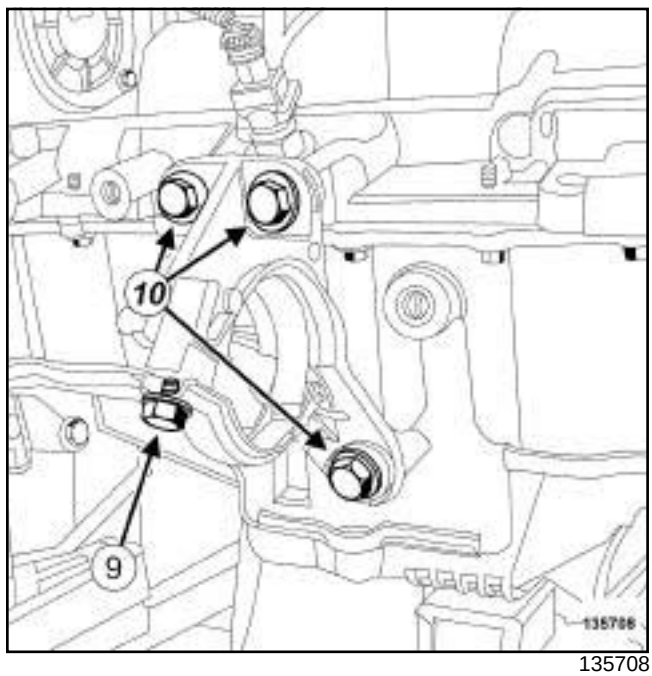
145789

❏ Remove the cooling pipe support bolt (**3**) on the sump.



144756

❏ Remove the front axle subframe tie-rod upper bolts (**5**) .

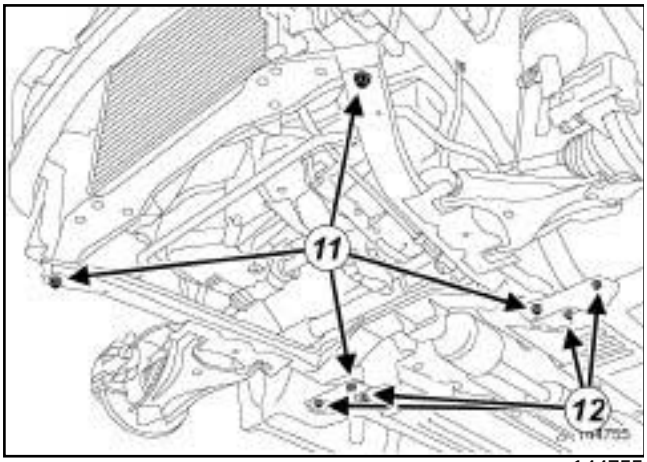


135708

❏ Remove:

- the right-hand driveshaft flange bolt (**9**) on the relay bearing,
- the bolts (**10**) from the relay bearing,
- the relay bearing.

K9K



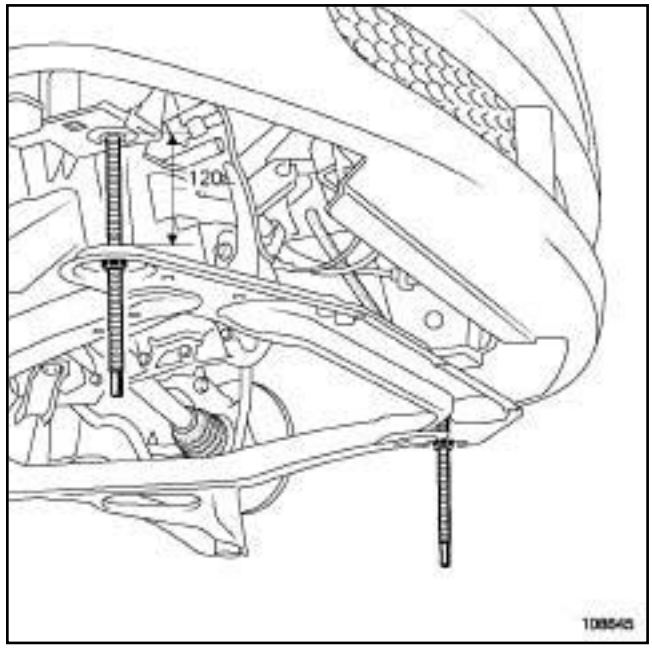
144755

❑ Remove:

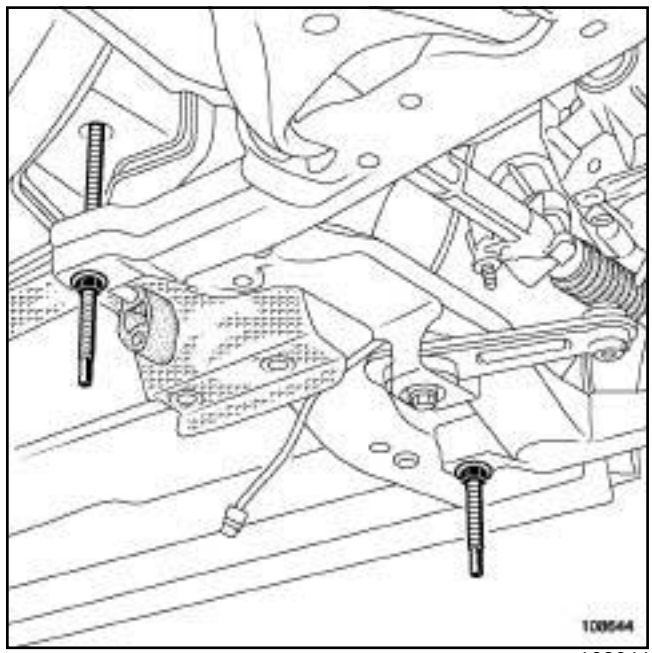
- the bracket bolts (**12**) ,
- one by one, the front axle subframe bolts (**11**) and replace them in turn with the threaded rods of the **(Tav. 1747)**.

Note:

Make sure the threaded rod of the **(Tav. 1747)** is sufficiently screwed into the threaded hole and that the nut of the tool is correctly resting on the front axle subframe.



108645



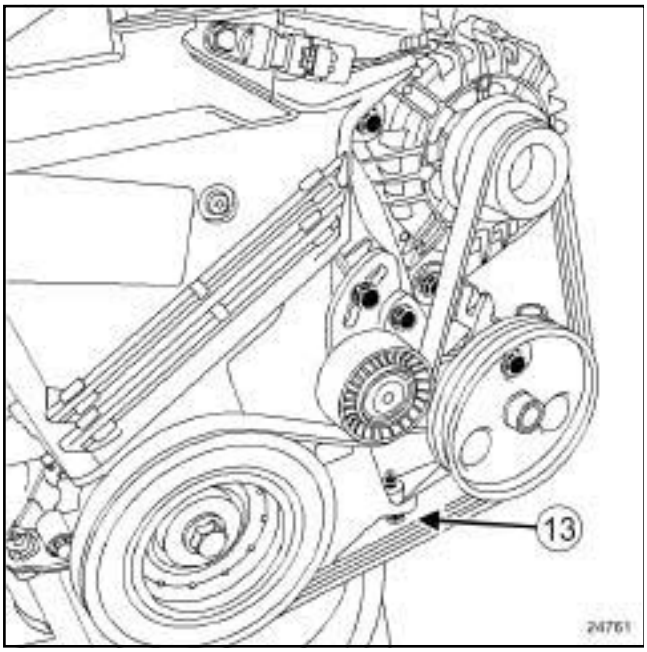
108644

❑ Lower the front axle subframe **120 mm**, gradually loosening the nuts of the **(Tav. 1747)**.

K9K

II - REMOVAL OPERATION

STANDARD HEATING RECIRCULATION

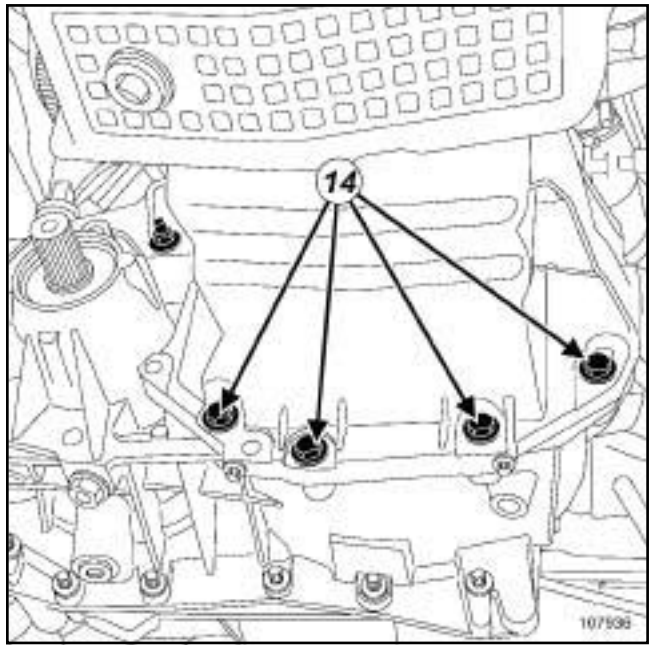


24761

❑ Remove the power-assisted steering pump support bolt (**13**) on the sump.

AIR CONDITIONING

❑ Remove the bolt from the sump on the multifunction support.



107936

❑ Remove:

- the engine-gearbox coupling bolts (**14**) ,
- the sump bolts,
- the sump.

Note:

If the sump cannot be extracted because it is in contact with the oil pump strainer, do not force the removal of the sump as this may damage the oil splash plate.

Loosen the oil pump bolts by a few turns (the tip of your finger should pass between the bolt head and the oil pump casing) using 10 mm and 13 mm open-jawed spanners and while tilting the sump towards the front of the vehicle.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: engine oil sump seal**.

❑ **parts always to be replaced: Front sub-frame bolt**.

WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

K9K

❑ Clean the cylinder block joint face using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

WARNING

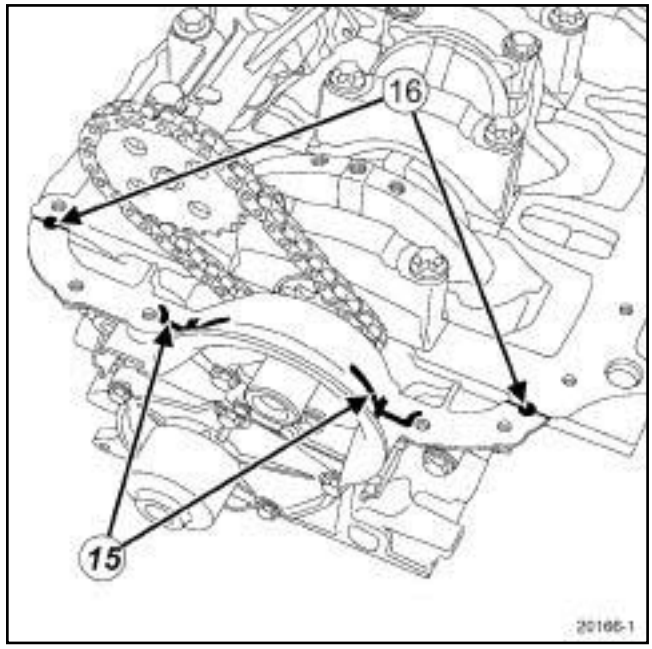
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

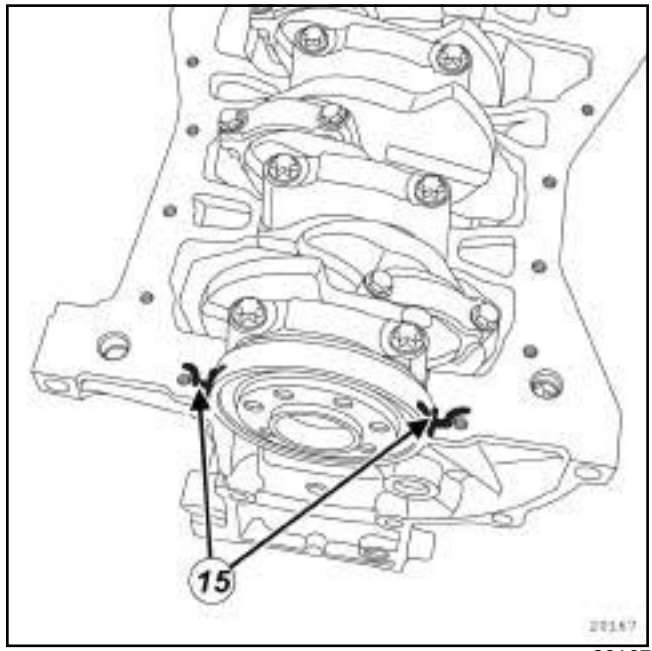
- the sump joint face if it is to be reused,
- the cylinder block gasket face.

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).



20166



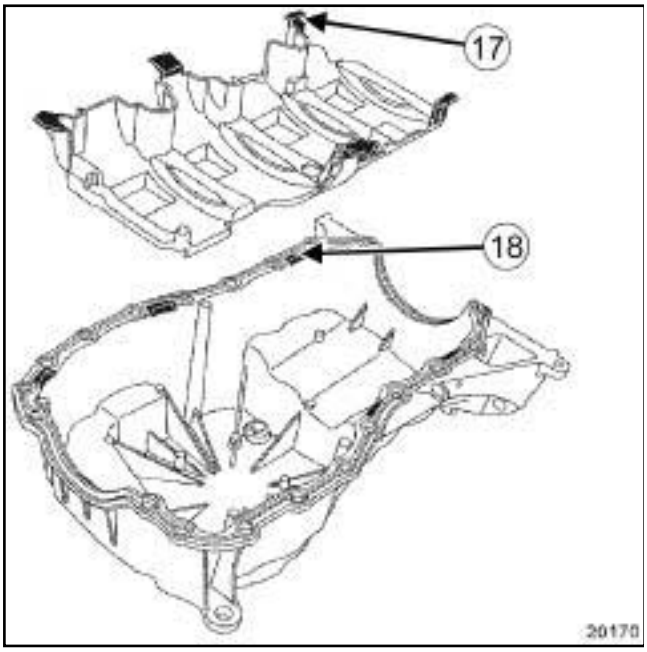
20167

❑ Apply:

- four beads (**15**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **5 mm**,
- two drops (**16**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **5 mm** at the intersection between the cylinder block and the crankshaft closure panel.

K9K

II - REFITTING OPERATION



20170

❑

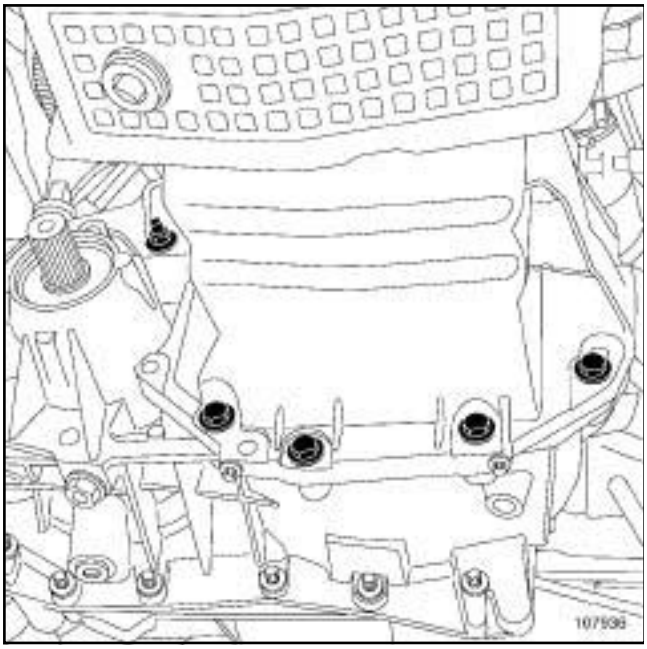
Note:

When refitting the sump, ensure that:

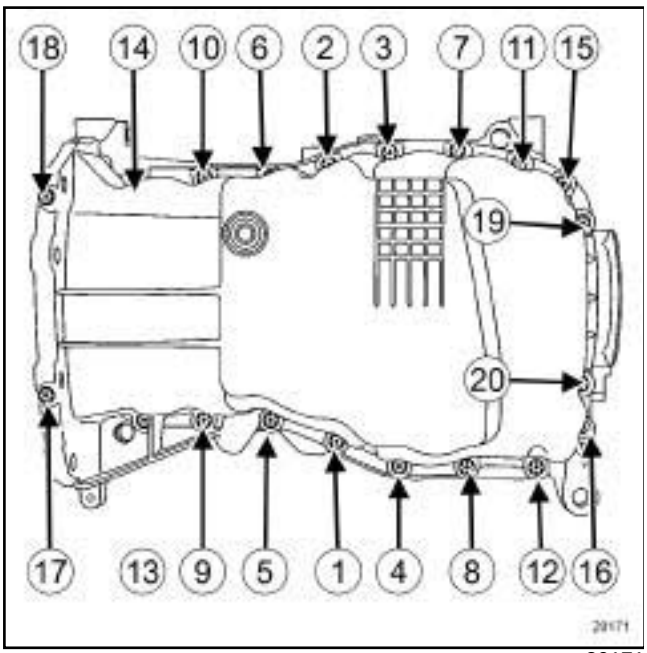
- the oil splash plate tabs (**17**) are positioned correctly in the slots (**18**) ,
- the coupling faces of the sump and cylinder block are correctly aligned, to prevent the clutch housing being deformed when fitting the gearbox.

Refit the oil splash plate.

K9K



107936



20171

❑ Refit the oil sump fitted with a new seal.

Note:

If the oil pump was loosened beforehand in order to extract the sump, position the sump in order to slide the oil pump strainer into the oil splash plate of the sump.

Position a component jack to support the sump.

Lean the sump towards the front of the vehicle in order to access the oil pump bolts.

Torque tighten the **oil pump bolts (25 N.m)** using the small torque wrench **77 11 226 888**.

Note:

Before pressing the sump on the cylinder block, check that the sump seal is still in place and that it has not come out of the grooves on the sides.

❑ Tighten until contact:

- the sump bolts on the cylinder block,
- the sump bolts on the gearbox.

❑ Torque tighten:

- in order the **sump bolts on the cylinder block (14 N.m)**,
- the **sump bolts on the gearbox (44 N.m)**.

AIR CONDITIONING

❑ Refit the sump bolt on the multifunction support.

❑ Torque tighten the **sump bolts on the multifunction support (25 N.m)**.

STANDARD HEATING RECIRCULATION

❑ Refit the power-assisted steering pump support on the sump.

❑ Torque tighten the **power assisted steering pump support bolt on the sump (25 N.m)**.

III - FINAL OPERATION

❑ Fit the front axle subframe.

❑ Refit the brackets.

❑ Torque tighten the **bracket bolts (62 N.m)**.

K9K

❏ One by one, remove the threaded rods of the **(Tav. 1747)** and replace them in turn with new front axle subframe bolts.

❏ Refit:

- the relay bearing bolts,
- the right-hand driveshaft flange bolt(s) on the relay bearing.

❏ Tighten to torque and in order:

- the **relay bearing bolts (44 N.m)**,
- the **right-hand driveshaft flange bolt(s) on the relay bearing (21 N.m)**.

❏ Refit the front axle subframe tie-rod upper bolts.

❏ Torque tighten the **front axle subframe tie-rod upper bolts (21 N.m)**.

❏ Refit the cooling pipe support bolt on the sump.

❏ Refit the power-assisted steering low pressure pipe bolt on the front axle subframe.

❏ Torque tighten the **power-assisted steering low pressure pipe bolt on the front axle subframe (25 N.m)**.

❏ Refit the catalytic converter upstream stay (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .

❏ Refit the steering box bolts on the front axle subframe (see **Steering box: Removal - Refitting**) (36A, Steering assembly).

❏ Refit:

- the steering box heat shield,
- the lower arm ball joints (see **Front driveshaft lower arm: Removal - Refitting**) (31A, Front axle components),
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

❏ Refit the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55, Exterior protection).

❏ Refit:

- the engine undertray,
- the front wheel arch side liners,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

K4M

Special tooling required	
Tav. 1747	Threaded rods for carrying out subframe operations.

Tightening torques ▽	
sump bolts on the cylinder block	**14 N.m**
sump bolts on the gearbox	**44 N.m**
sump bolt on the multifunction support	**25 N.m**
bracket bolts	**62 N.m**
front axle subframe bolts	**110 N.m**
relay bearing bolts	**44 N.m**
right-hand driveshaft flange bolt(s) on the relay bearing	**21 N.m**
front axle subframe tie-rod upper bolts	**21 N.m**
power-assisted steering low pressure pipe bolt on the front axle subframe	**21 N.m**
steering box bolts on the front axle subframe	**105 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

❏ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

❏ Remove:

- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch side liners,
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

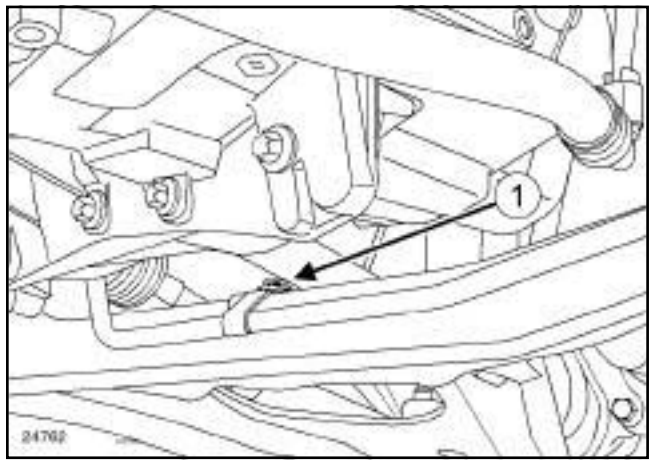
❏ Extract the lower arm ball joints from the stub axle carrier (see **Front driveshaft lower arm: Removal - Refitting**) (31A, Front axle components).

❏ Unclip the downstream oxygen sensor wiring on the heat shield on the steering box.

❏ Remove (see **Steering box: Removal - Refitting**) (36A, Steering assembly):

- the heat shield bolts on the steering box,
- the steering box heat shield,
- the steering box bolts on the front axle subframe.

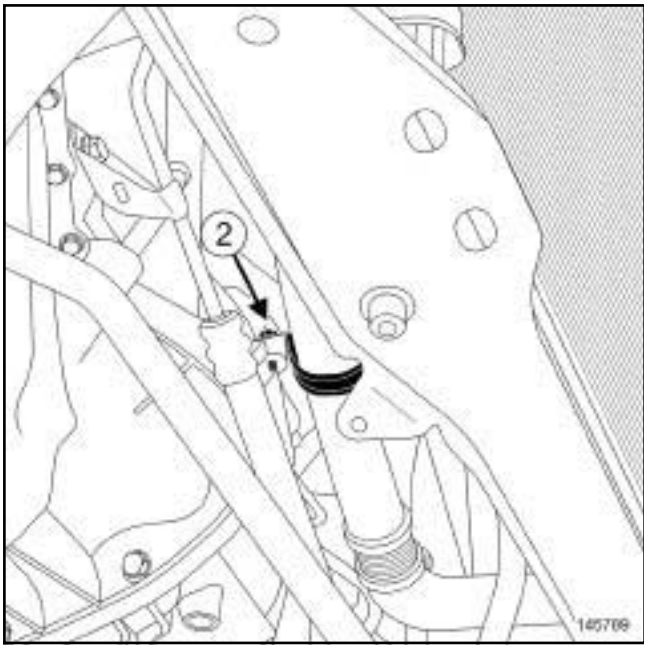
❏ Attach the steering rack to the body.



24762

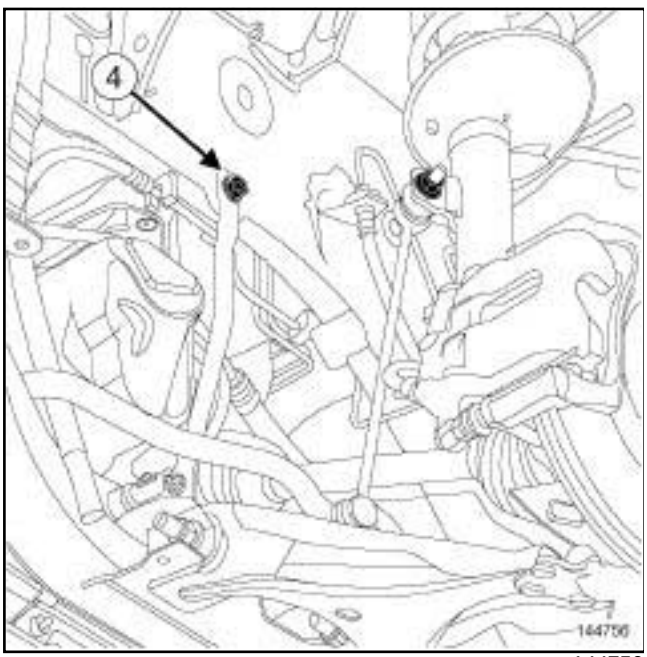
❏ Remove the power-assisted steering low pressure pipe bolt (**1**) on the front axle subframe.

K4M



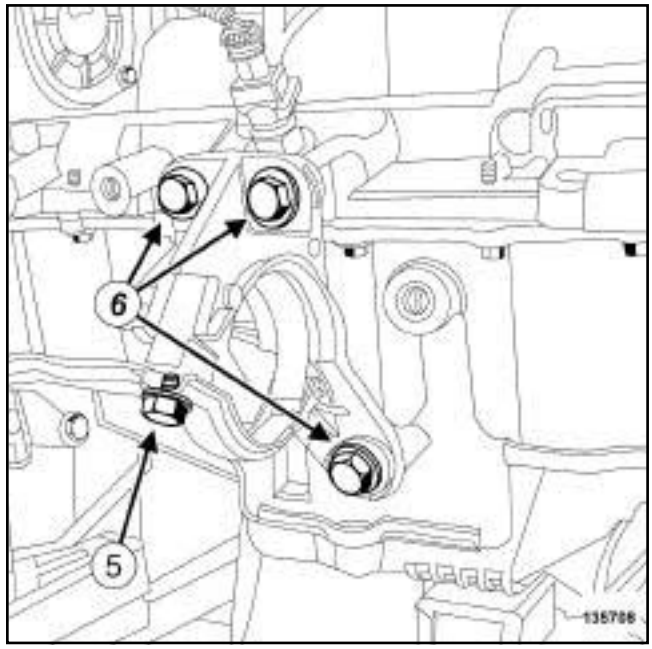
145789

❑ Remove the cooling pipe support bolt (**2**) on the sump.



144756

❑ Remove the front axle subframe tie-rod upper bolts (**4**) .

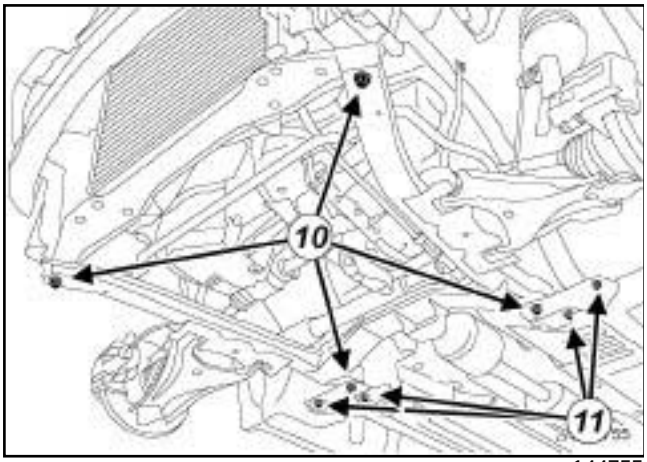


135708

❑ Remove:

- the right-hand driveshaft flange bolt (**5**) on the relay bearing,
- the bolts (**6**) from the relay bearing,
- the relay bearing.

K4M



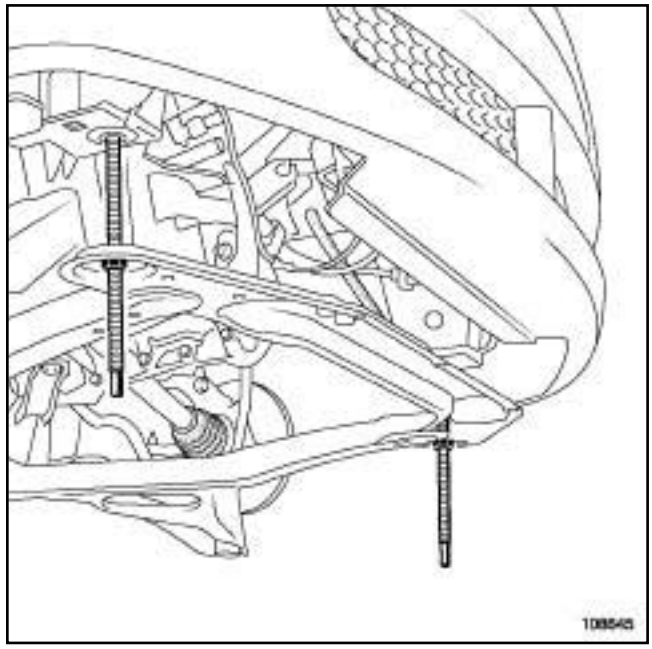
144755

❑ Remove:

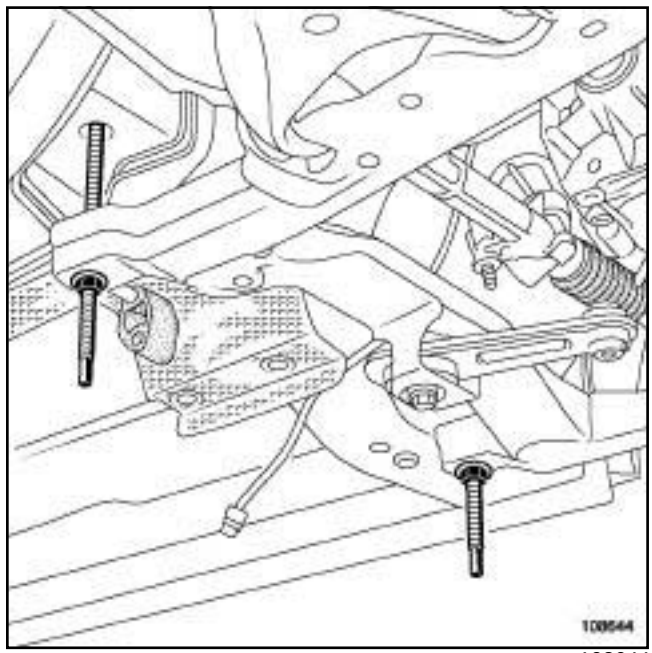
- the bracket bolts (**11**) ,
- one by one, the front axle subframe bolts (**10**) and replace them in turn with the threaded rods of the **(Tav. 1747)**.

Note:

Make sure the threaded rod of the **(Tav. 1747)** is sufficiently screwed into the threaded hole and that the nut of the tool is correctly resting on the front axle subframe.



108645

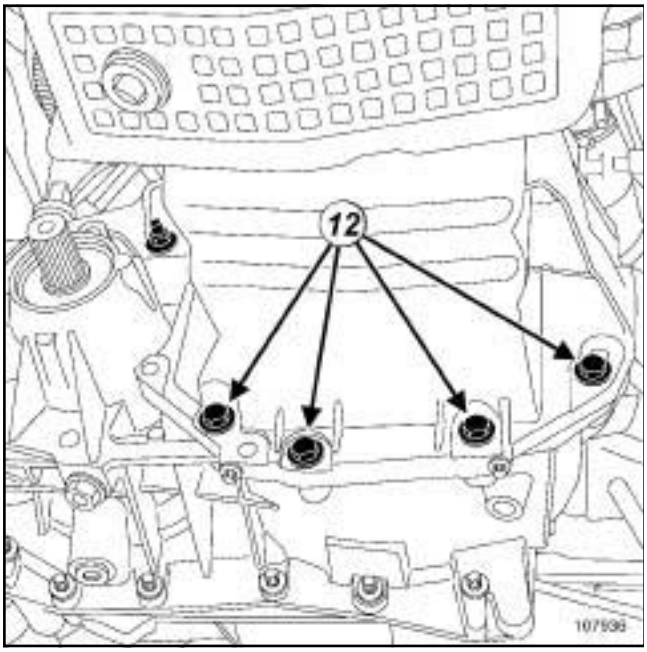


108644

❑ Lower the front axle subframe by at least **120 mm**, gradually loosening the nuts of the **(Tav. 1747)**.

K4M

II - REMOVAL OPERATION



107936

❑ Remove:

- the sump bolt from the multifunction support,
- the engine-gearbox coupling bolts (**12**) ,
- the sump bolts on the cylinder block,
- the sump,
- the oil splash plate.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: engine oil sump seal**.

❑ **parts always to be replaced: Front sub-frame bolt**.

WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Clean the cylinder block joint face using **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

WARNING

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

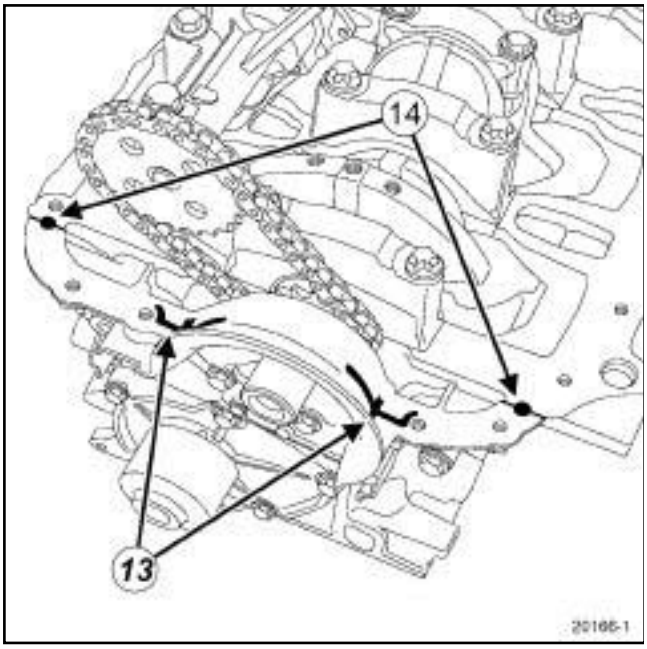
❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the sump joint face if it is to be reused,
- the cylinder block gasket face.

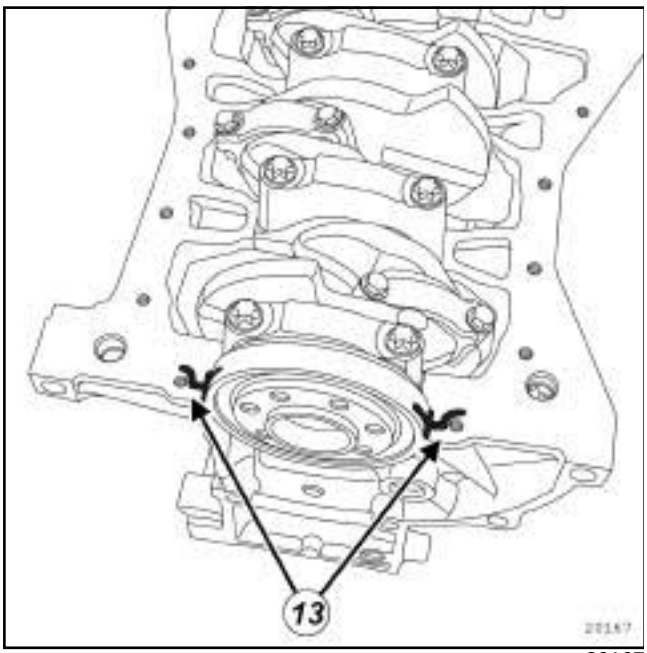
WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

K4M



20166

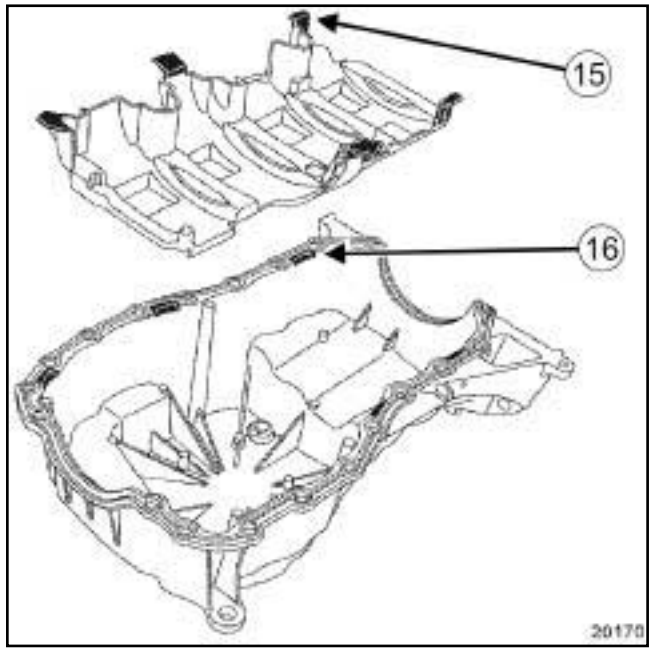


20167

❑ Apply:

- four beads (**13**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **5 mm**,
- two drops (**14**) of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) with a diameter of **5 mm** at the intersection between the cylinder block and the crankshaft closure panel.

II - REFITTING OPERATION



20170

❑

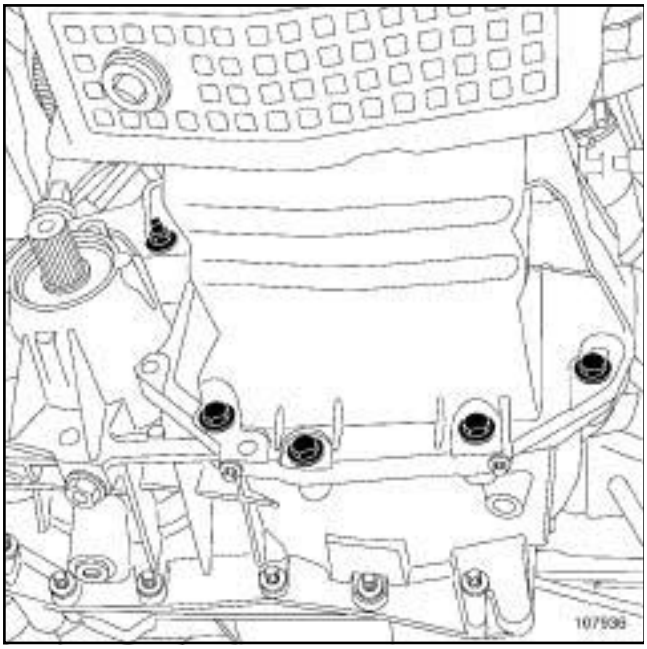
Note:

When removing the sump, ensure that:

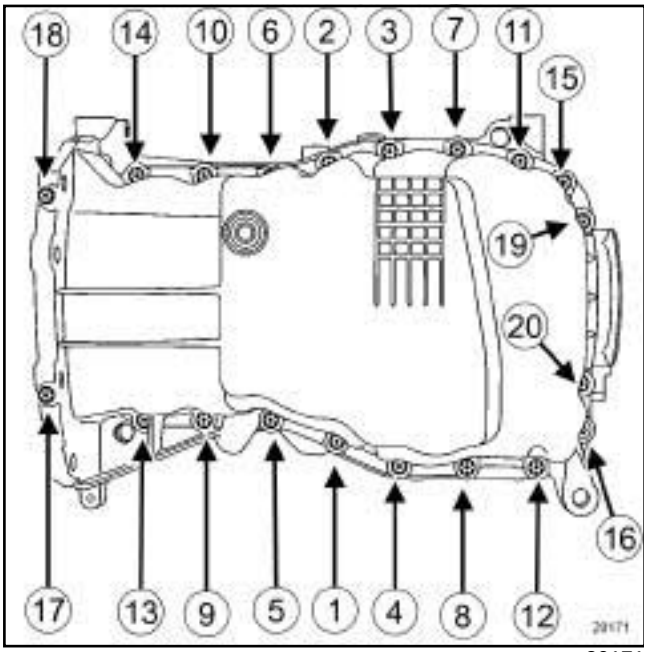
- the oil splash plate tabs (**15**) are positioned correctly in the slots (**16**) ,
- the coupling faces of the sump and cylinder block are correctly aligned, to prevent the clutch housing being deformed when fitting the gearbox.

Refit the oil splash plate.

K4M



107936



20171

❏ Refit the oil sump fitted with a new seal.

❏ Tighten until contact:

- the sump bolts on the cylinder block,
- the bolts from the sump on the gearbox,
- the sump bolts from the multifunction support.

❏ Torque tighten:

- in order the **sump bolts on the cylinder block (14 N.m)**,
- the **sump bolts on the gearbox (44 N.m)**,
- the **sump bolt on the multifunction support (25 N.m)**.

III - FINAL OPERATION

❏ Fit the front axle subframe.

❏ Refit the brackets.

❏ Torque tighten the **bracket bolts (62 N.m)**.

❏ One by one, remove the threaded rods of the **(Tav. 1747)** and replace them in turn with new front axle subframe bolts.

K4M

❏ Torque tighten the **front axle subframe bolts (110 N.m)**.

❏ Refit:

- the relay bearing bolts,
- the right-hand driveshaft flange bolt(s) on the relay bearing.

❏ Tighten to torque and in order:

- the **relay bearing bolts (44 N.m)**,
- the **right-hand driveshaft flange bolt(s) on the relay bearing (21 N.m)**.

❏ Refit the front axle subframe tie-rod upper bolts.

❏ Torque tighten the **front axle subframe tie-rod upper bolts (21 N.m)**.

❏ Refit the cooling pipe support bolt on the sump.

❏ Refit the power-assisted steering low pressure pipe bolt on the front axle subframe.

❏ Torque tighten the **power-assisted steering low pressure pipe bolt on the front axle subframe (21 N.m)**.

❏ Refit the steering box bolts on the front axle subframe.

❏ Tighten to torque the **steering box bolts on the front axle subframe (105 N.m)**.

❏ Refit:

- the steering box heat shield,
- the lower arm ball joints (see **Front driveshaft lower arm: Removal - Refitting**) (31A, Front axle components),
- the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

K4M

❑ Refit the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❑ Refit:

- the engine undertray,
- the front wheel arch side liners,
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

K9K

Equipment required
safety strap(s)
component jack
indelible pencil
torque wrench
Diagnostic tool

Tightening torques ▽	
con rod cap bolts	**20 N.m + 45° ± 6°**
oil pump bolts	**25 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Vehicle: Precautions for the repair**) .

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the engine undertray.

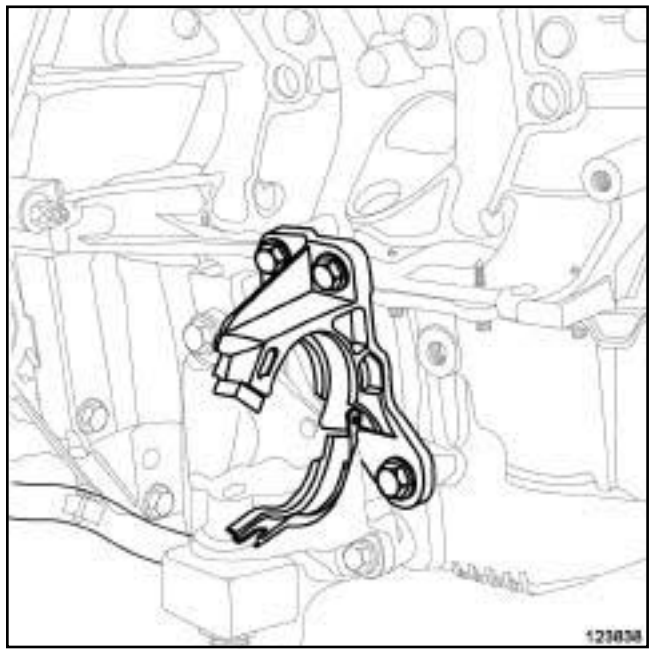
❏ Drain the oil from the engine (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

❏ Remove the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-34**) .

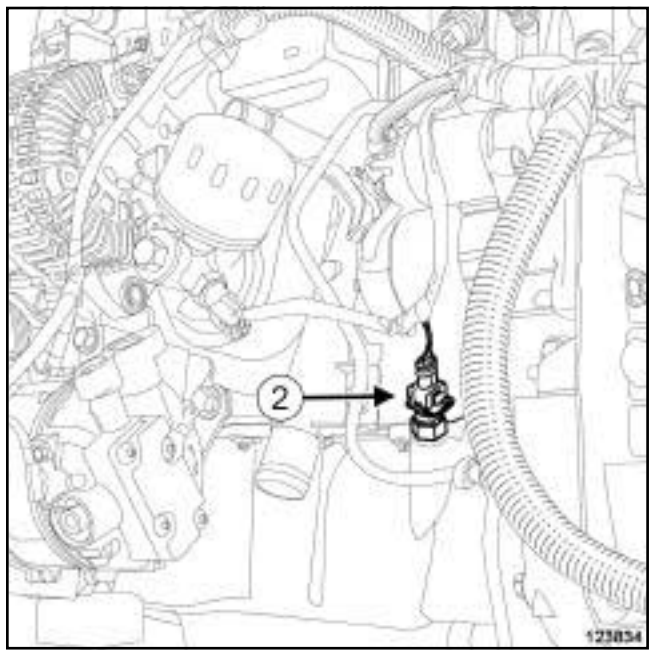
❏ Remove the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

❏ Strap the radiator to the vehicle using **safety strap(s)**.

❏ Remove the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components).


123838

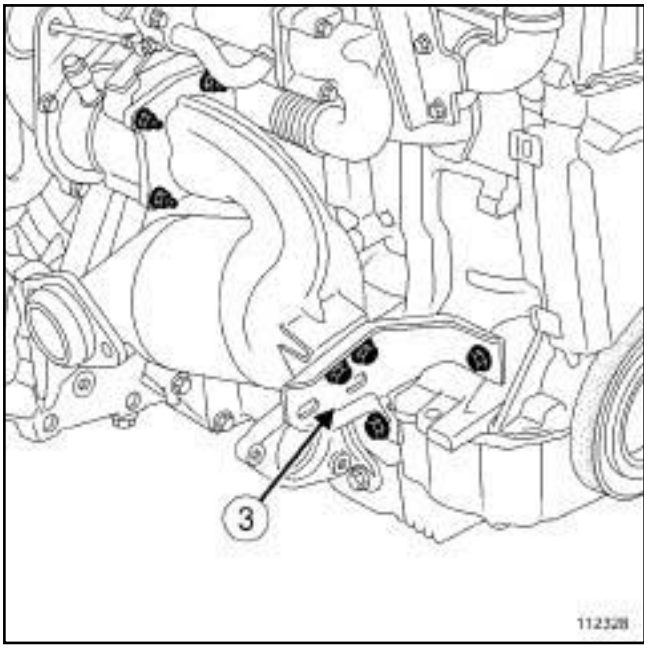
❏ Remove the relay bearing of the front right-hand wheel driveshaft.



123834

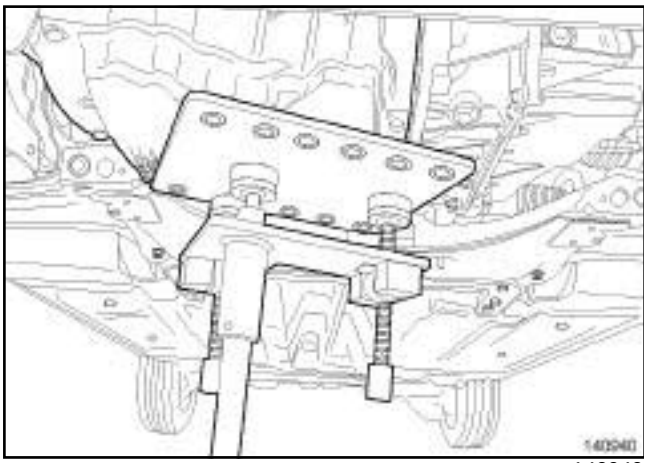
❏ Disconnect the oil level sensor connector (if equipped) (**2**) .

K9K



112328

❑ Remove the catalytic converter upstream stay (**3**) .



140940

❑

WARNING

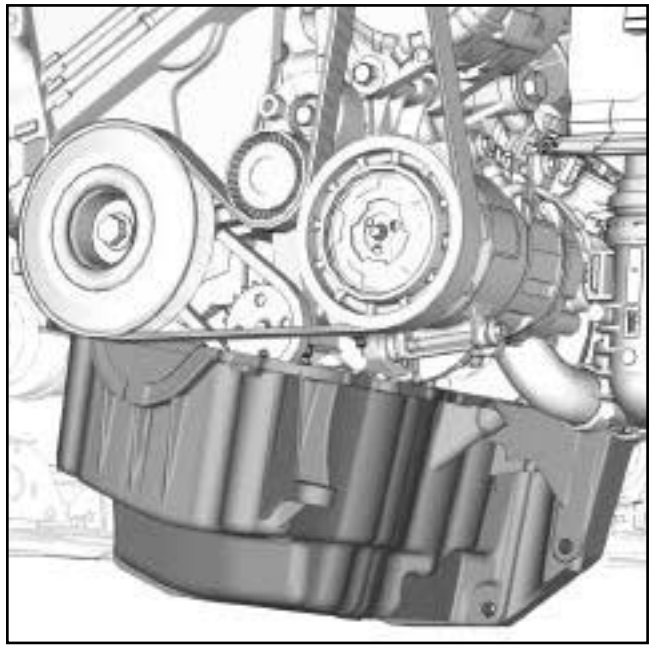
Failure to observe the following procedure may damage the oil pump strainer.

Undo the bolts of the engine oil sump.

❑ Fit a **component jack** to support the engine oil sump.

❑ Remove the bolts from the engine oil sump.

❑ Detach the engine oil sump, while supporting it with the **component jack**.



140917

❑ Tilt the engine oil sump forwards in order to access the oil pump bolts.

❑ Partially loosen the oil pump bolts **3 mm** to **5 mm**.

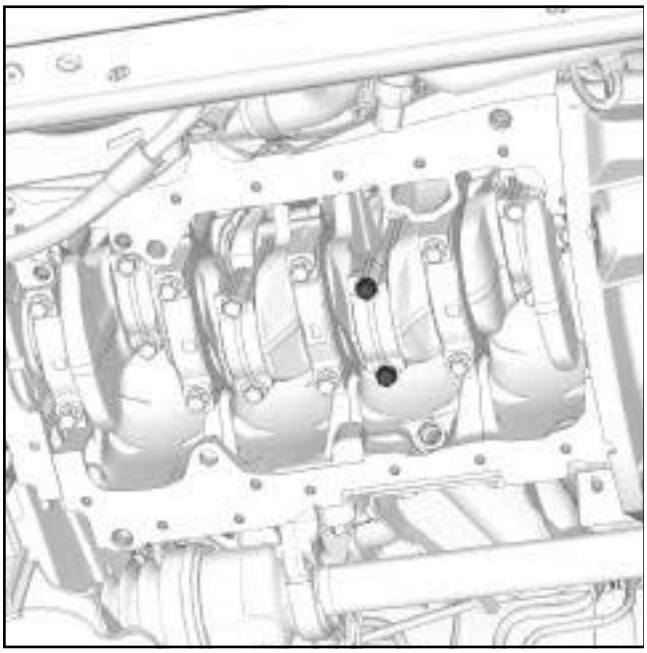
❑ Detach the oil pump from its position in order to remove the engine oil sump.

❑ Remove:

- the engine oil sump,
- the engine oil sump seal,
- the oil pump.

K9K

II - REMOVAL OPERATION FOR THE CON ROD BEARING SHELLS NO.2

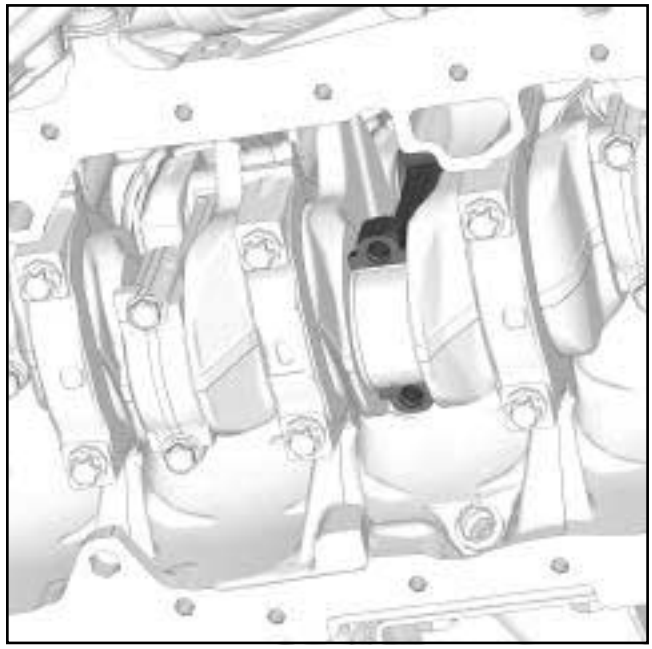


139306

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the big ends.

❑ Mark the position of the con rod cap in relation to the con rod body using a **indelible pencil**.

❑ Position the crankshaft at Top Dead Centre.



139300

❑ Remove:

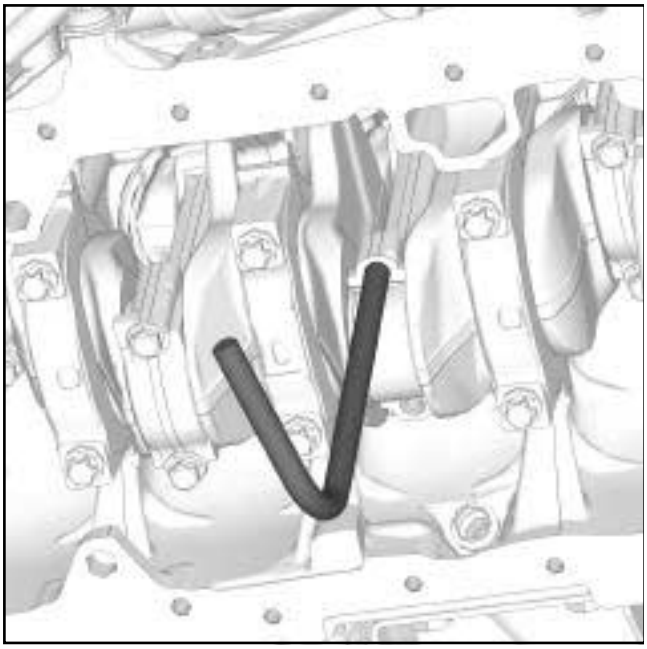
- the con rod bolts,
- the con rod cap,
- the lower con rod bearing shell.

Note:

If reusing the con rod bearing shells, mark the position of the lower con rod bearing shell in relation to the con rod cap.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - products) to clean the bearing mating face on the con rod cap.

K9K

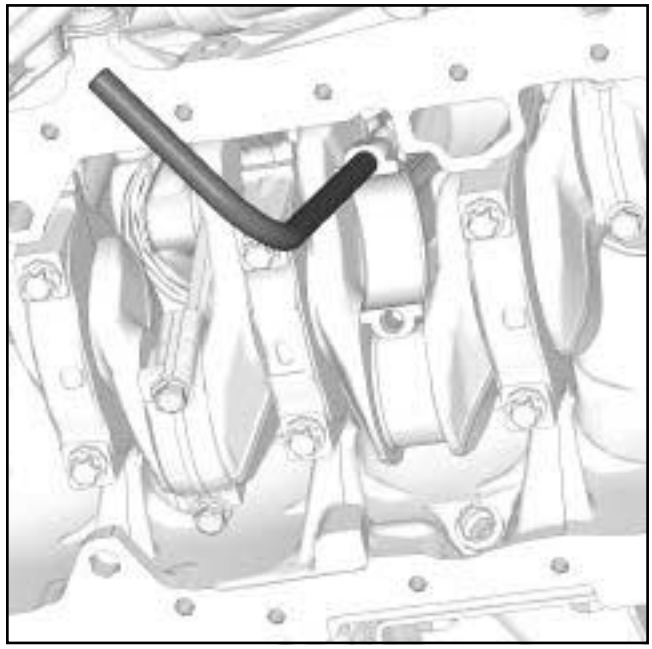


139310

❑ Fit the tie rod of the toolon the con rod body.

❑ Push the con rod upwards to release the con rod from the crankpin.

❑ Turn the crankshaft **90°** clockwise (timing end).



139315

❑

WARNING

Failure to observe the following procedure may damage the piston base cooling jets.

Pull the con rod - piston assembly using the tie rod of the tool, taking care not to allow the piston to touch the piston base cooling jets.

❑ Remove the upper con rod bearing shell.

Note:

If reusing the con rod bearing shells, mark the position of the upper con rod bearing shell in relation to the con rod body.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - products) to clean the bearing mating face on the con rod body.

REFITTING

I - REFITTING OPERATION FOR THE CON ROD BEARING SHELLS ON CYLINDER NO.2

❑ **parts always to be replaced: con rod cap bolts**

K9K

❑

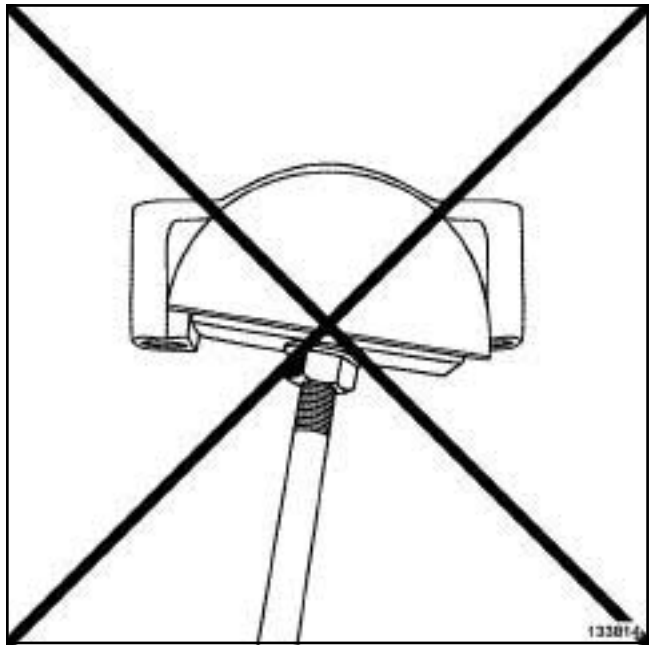
Note:

Always replace con rod bearing shells with a width of **20 mm** by con rod bearing shells with a width of **18 mm**.

If the set of con rod bearing shells only includes con rod bearing shells which are **18mm** wide, only use the head of the toolwith the marking " **K9K SUP** ".

Fit the head of the toolwith the marking " **K9K INF** " on the threaded sleeve of the tool.

❑ Position the lower con rod bearing shell on the tool.



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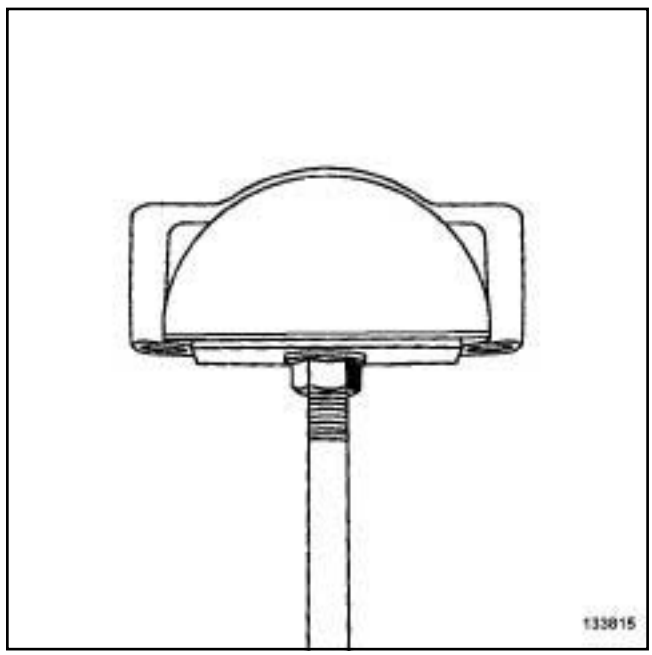


133815

❑

Note:

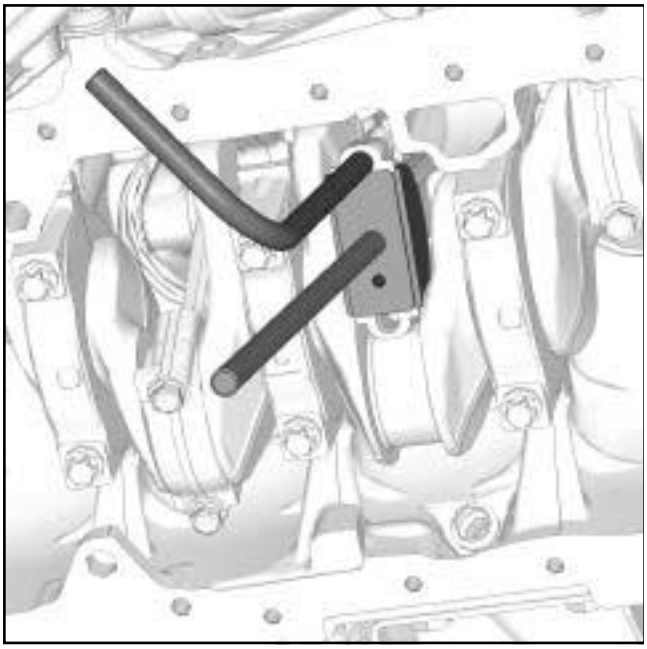
The contact surface between the bearing shell and the con rod must be dry and free of grease.

Fit the lower con rod bearing shell on the con rod cap using the tool.

❑ Position the lower con rod bearing shell so that the ends do not protrude beyond the con rod cap.

❑ Lubricate the surface of the con rod bearing shell (crankshaft end) using new engine oil.

K9K



139318

❑ Remove the tool head with the marking " **K9K INF** " and fit the head with the marking " **K9K SUP** ".

❑ Position the upper con rod bearing shell on the tool.

❑ Fit the upper con rod bearing shell on the con rod body using the tool.

❑ Position the upper con rod bearing shell so that the ends do not protrude beyond the con rod body.

❑ Lubricate the surface of the con rod bearing shell (crankshaft end) using new engine oil.

❑ Push the con rod - piston assembly back up into place.

❑ Turn the crankshaft **90°** anticlockwise.

❑ Lubricate the crankpin with new engine oil.

❑ Pull the con rod - piston assembly to position the con rod on the crankshaft.

❑

Note:

Before refitting the con rod cap, ensure that there are no impurities (filings, cloth lint, etc.) on the con rod body or cap surfaces.

Refit:

- the con rod cap according to the mark made during removal,
- the new con rod bolts.

❑ Torque and angle tighten the **con rod cap bolts (20 N.m + 45° ± 6°)**.

II - REMOVAL - REFITTING OPERATIONS FOR THE CON ROD BEARING SHELLS ON CYLINDERS NO.3, 1 AND 4

❑ Perform the same removal - refitting operations as for the con rod bearing shells on cylinder no. 2.

Note:

For removing and refitting the con rod bearing shells on cylinders no. 1 and no. 4, position the pistons at Bottom Dead Centre before performing the same removal and refitting operations as for the con rod bearing shells on cylinder no. 2.

III - FINAL OPERATION

❑ **parts always to be replaced: engine oil sump seal**

parts always to be replaced: Oil filter

parts always to be replaced: Drain plug seal on engine oil sump

WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use a wooden spatula or an **ABRASIVE PAD** to clean the joint face of the cylinder block and engine oil sump.

❑ Refit the oil pump.

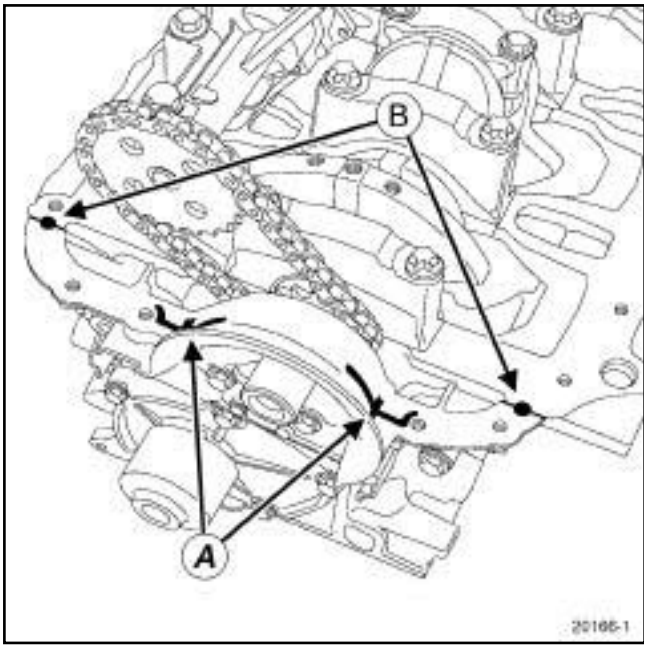
❑ Fit without tightening the oil pump bolts, while keeping a clearance of **3 mm** to **5 mm**.

❑ Fit the engine oil sump seal.

WARNING

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

K9K



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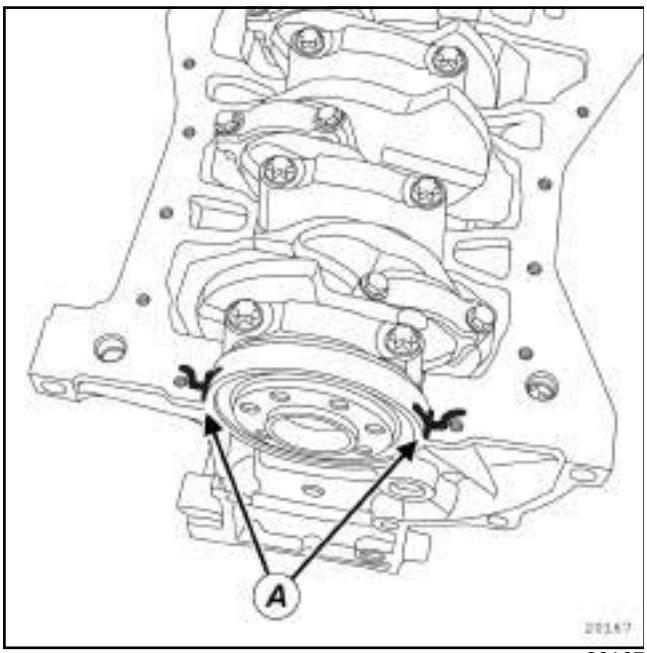
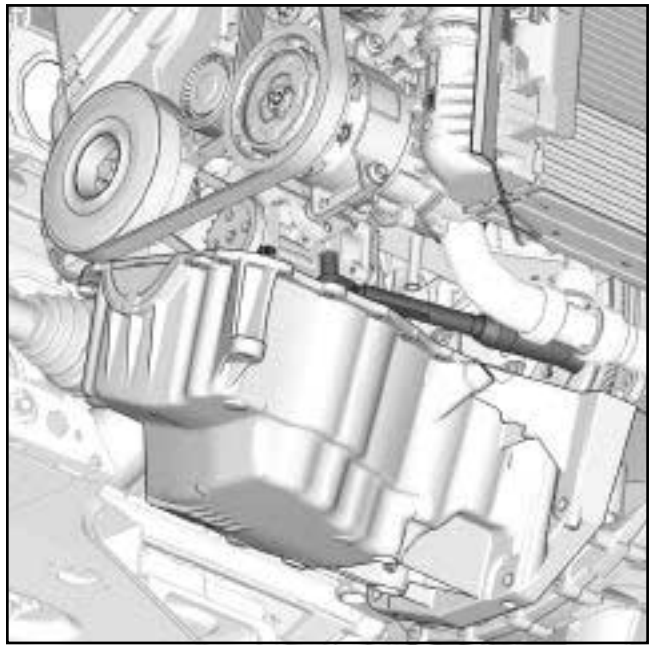


20167

❑ Apply **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) :

- four beads with a diameter of **5 mm** at (**A**) ,
- two drops with a diameter of **5 mm** at (**B**) .

❑ Fit the engine oil sump while supporting it using a **component jack**.


140918

❑ Tilt the engine oil sump forwards in order to access the oil pump bolts.

❑ Torque tighten the **oil pump bolts (25 N.m)** using the **torque wrench** PROSTEEL, part number **77 11 226 888** starting with the **13 mm** bolt.

❑

Note:

Check that the engine oil sump seal is definitely in place before tightening the engine oil sump bolts.

❑ Refit the engine oil sump bolts.

❑ Torque tighten in order the engine oil sump bolts (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-9**) .

❑ Refit the catalytic converter upstream stay (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .

❑ Connect the connector to the oil level sensor.

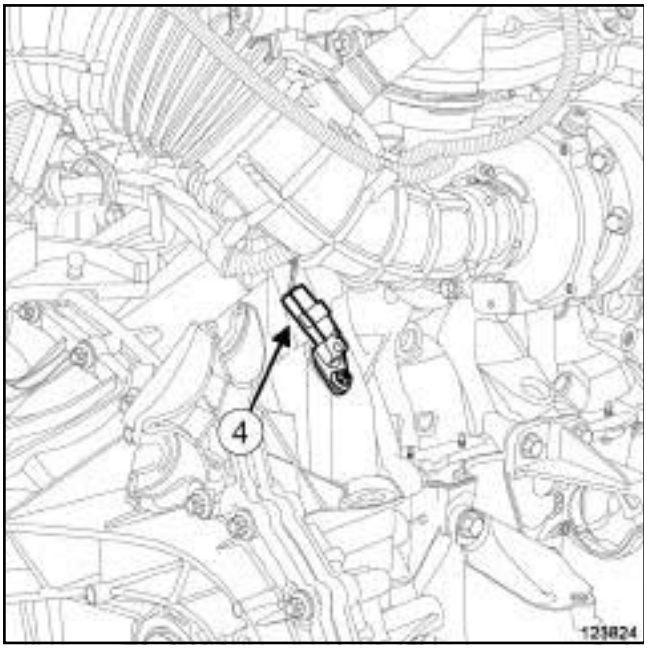
❑ Refit the relay bearing of the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) .

❑ Refit the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components).

❑ Remove the **safety strap(s)** from the radiator.

❑ Refit the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

K9K



123824

- ❏ Disconnect the crankshaft position sensor (**4**) to prevent the engine from starting.
- ❏ Refit the oil filter (see **10A**, **Engine and cylinder block assembly**, **Oil filter: Removal - Refitting**, page **10A-34**)
- ❏ Fill up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .
- ❏ Start the engine using the starter until the engine oil warning light goes out.
- ❏ Connect the crankshaft position sensor.
- ❏ Refit the engine undertray.
- ❏ Clear the present faults using the **Diagnostic tool**.

K4M or K9K

Equipment required
oil recovery tray
oil change wrench
torque wrench
oil change end piece with an 8 mm square drive

Tightening torques ▽	
drain plug	**20 N.m**

DRAINING

I - AVERAGE CAPACITY OF ENGINE OIL

K4M

❑ **4.7 litres** (without oil filter replacement).

❑ **4.8 litres** (with oil filter replacement).

K9K

❑ **4.0 litres** (without oil filter replacement).

❑ **4.1 litres** (with oil filter replacement).

II - RECOMMENDATIONS FOR REPAIR

❑

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking with a dipstick.

III - PARTS AND CONSUMABLES FOR REPAIR

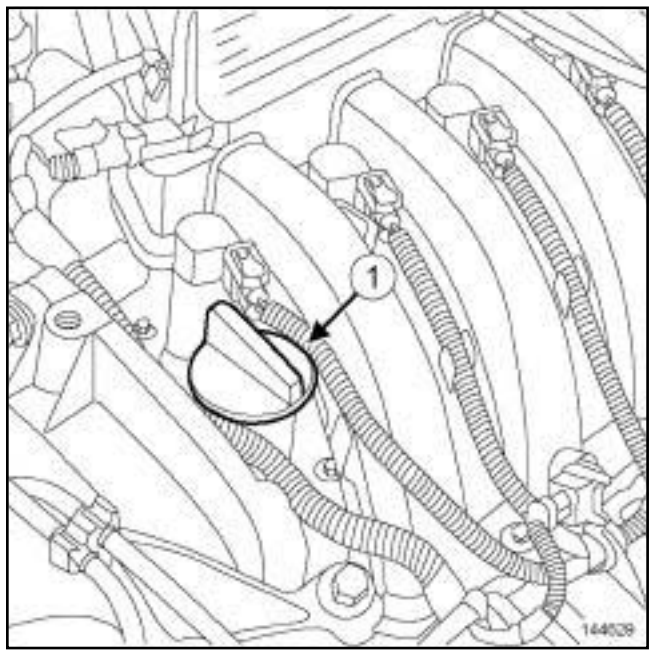
❑ **parts always to be replaced: Drain plug seal on engine oil sump**.

❑ Consumable:

- Engine oil (see **Engine oil: Specifications**) .

IV - OIL SERVICE

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).



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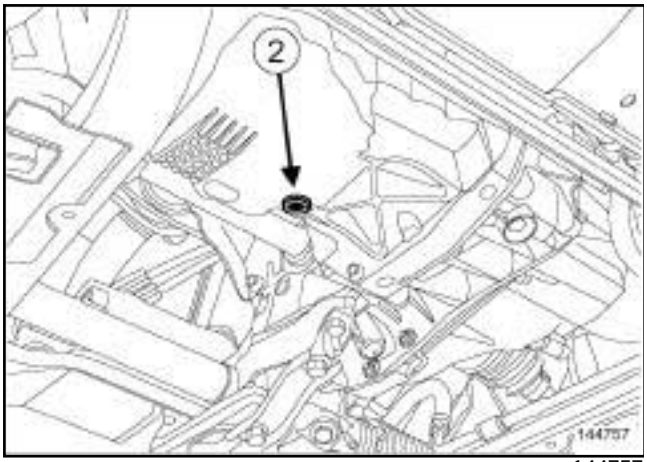
❑ Remove:

- the engine oil filler cap (**1**) ,
- the dipstick.

❑ Place the **oil recovery tray** under the engine.

K4M or K9K



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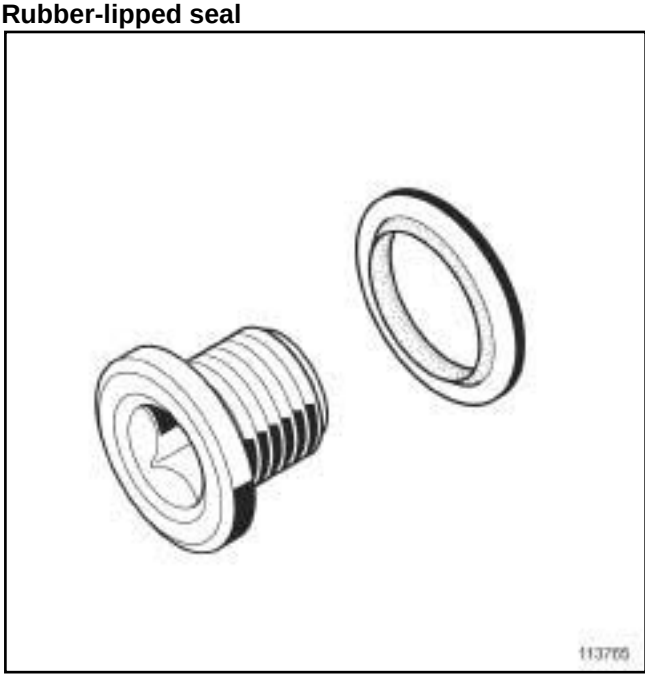
❏ Remove the drain plug (**2**) using theor a **oil change wrench**.

❏ Let the engine oil flow out completely.

❏ Remove the drain plug seal.

Rubber-lipped seal



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❏ Refit a new seal to the drain plug (no direction of fitting).

❏ Refit the drain plug.

❏ Torque tighten the **drain plug (20 N.m)** using a **torque wrench** fitted with a **oil change end piece with an 8 mm square drive**.

❏ Clean any oil run-off from the engine oil sump using a cloth.

❏ Remove the **oil recovery tray**.

V - FILLING

❏ Fill the engine with oil, respecting the recommended quantity.

❏ Wait at least **10 minutes**.

❏ Check the oil level using the dipstick.

❏ Top up the engine oil level if necessary.

❏ Refit:

- the engine oil filler cap,
- the dipstick.

K9K

Special tooling required	
Mot. 1329	Oil filter removing tool (76 mm diameter)

WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

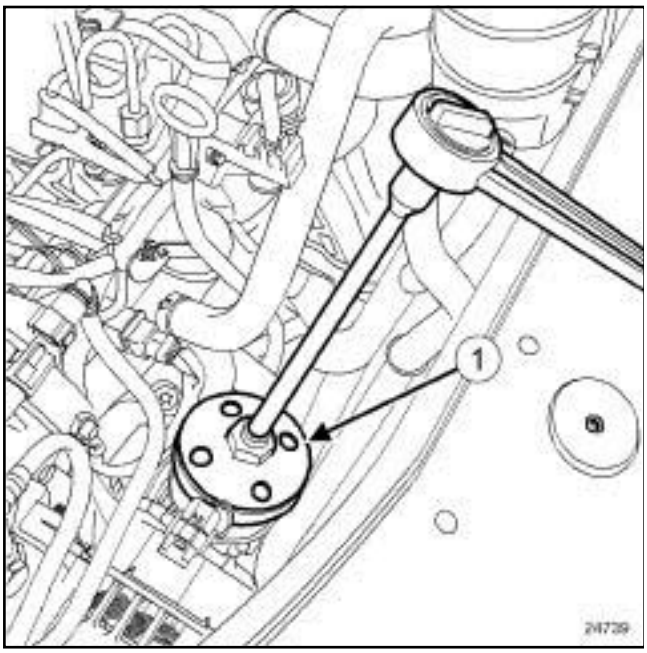
Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least 10 minutes for the oil to drain down before checking with a dipstick.

REMOVAL

OPERATION FOR REMOVAL OF PART CONCERNED



24739

❑ Position the **(Mot. 1329)** (**1**) with an extension piece and a ratchet on the oil filter.

❑ Remove the oil filter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Oil filter**.

❑ Lubricate the new oil filter seal with new engine oil.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Tighten the oil filter by hand until the oil filter seal makes contact with the oil filter support.

❑ Tighten the oil filter 3/4 of a turn manually or using the tool **(Mot. 1329)**.

III - FINAL OPERATION

❑ Wipe any oil run-off with a cloth.

❑ Check the oil level with the dipstick.

❑ Top up the oil level (if necessary).

K4M

Special tooling required	
Mot. 1329	Oil filter removing tool (76 mm diameter)

Equipment required
oil recovery tray

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking with a dipstick.

When removing the oil filter, check that the oil filter seal is not still stuck to the cylinder block or the oil filter support.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

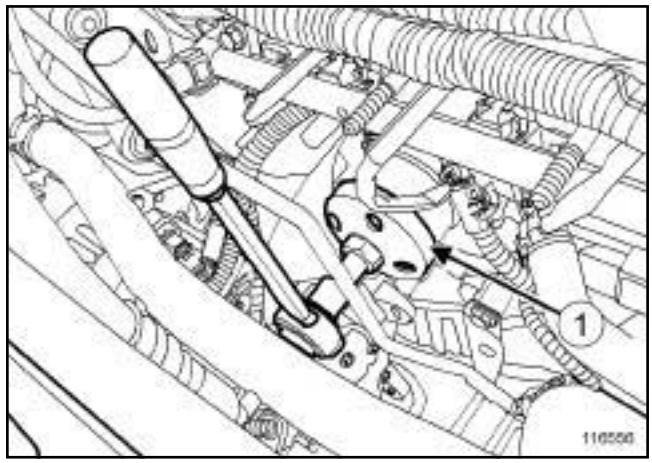
❑ Remove:

- the engine undertray bolts,
- the engine undertray.

❑ Place the **oil recovery tray** under the engine.

❑ Remove the injector rail protector.

II - REMOVAL OPERATION



116556

❑ Remove the oil filter using the **(Mot. 1329)** (**1**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Oil filter**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the cylinder block joint face.

❑ Lubricate the oil filter seal with new engine oil.

II - REFITTING OPERATION

❑ Fit a new oil filter.

❑ Tighten the oil filter until it makes contact with the engine.

❑ Manually tighten the oil filter by 3/4 of a turn.

III - FINAL OPERATION

❑ Refit the injector rail protector.

❑ Remove the **oil recovery tray**.

❑ Wipe any oil run-off with a cloth.

❑ Top up with engine oil recommended by the manufacturer (see **Engine oil: Specifications**) .

❑ Start the engine and wait until the oil pressure warning light goes out on the instrument panel.

❑ Check for leaks from the oil filter.

❑ Refit the engine undertray.

❑ Wait at least **10 minutes**.

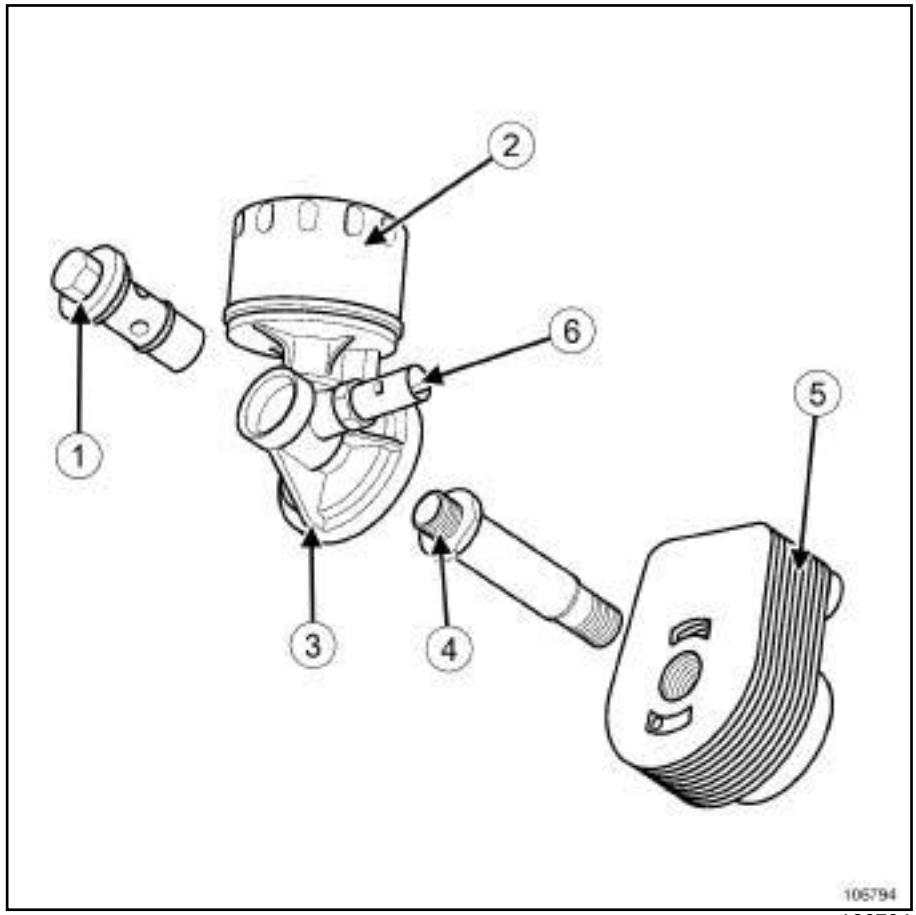
❑ Check the oil level using the dipstick.

K4M

❑ Top up the engine oil level to the dipstick if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

K9K, and 796

Tightening torques ▽	
oil heat exchanger bolt	**39 N.m**
oil filter support bolt	**28 N.m**



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(**1**) Oil filter holder mounting bolt
(**2**) Oil filter
(**3**) Oil filter holder
(**4**) Coolant - oil heat exchanger mounting bolts
(**5**) Coolant - oil heat exchanger
(**6**) Oil pressure sensor

❑

REMOVAL

REMOVAL PREPARATION OPERATION

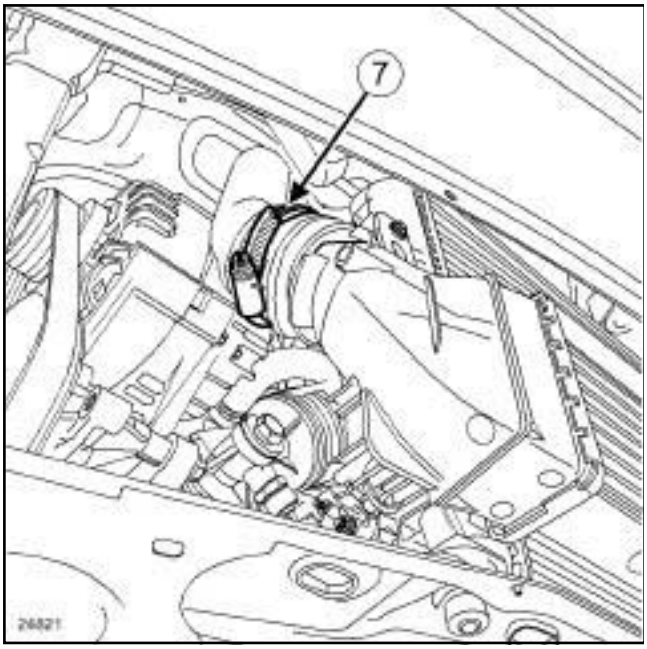
❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Remove:

- the engine cover,
- the engine undertray,
- the closure panel component under the diesel filter.

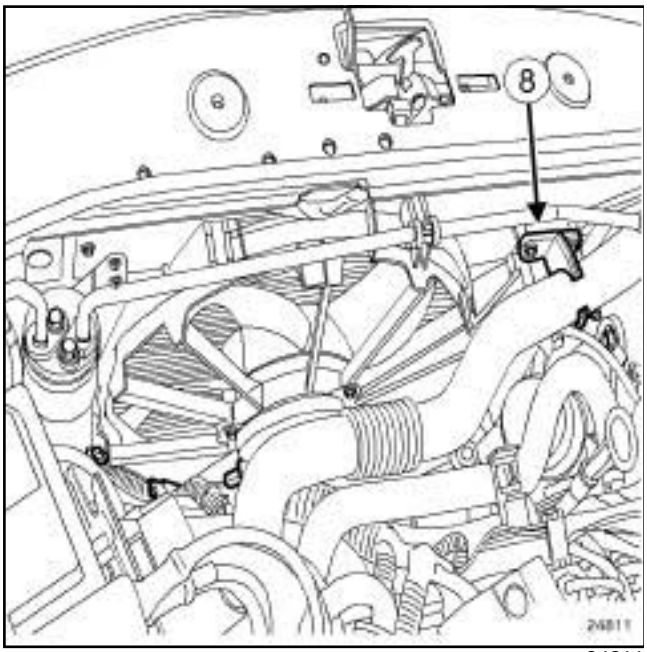
❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K9K, and 796



24821

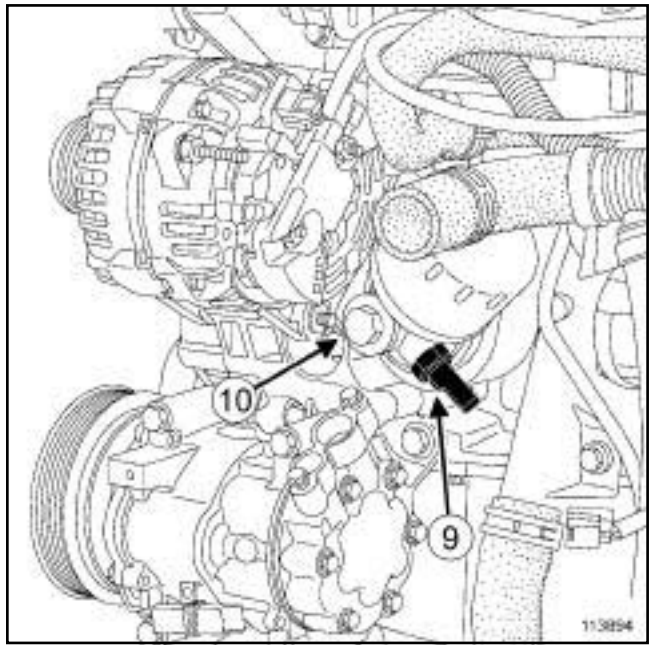
❏ Disconnect the air outlet duct (**7**) on the intercooler.



24811

❏ Move aside the air outlet duct.

❏ Remove the air outlet duct support (**8**) from the fan assembly mounting.



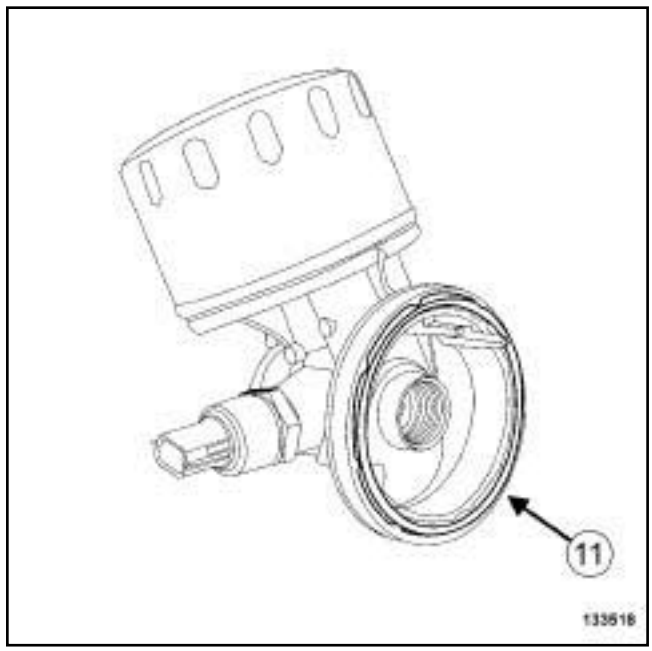
113894

❏ Disconnect the oil pressure sensor connector (**9**) .

❏ Place a container under the engine on the oil filter side.

❏ Remove the bolt (**10**) from the oil filter support.

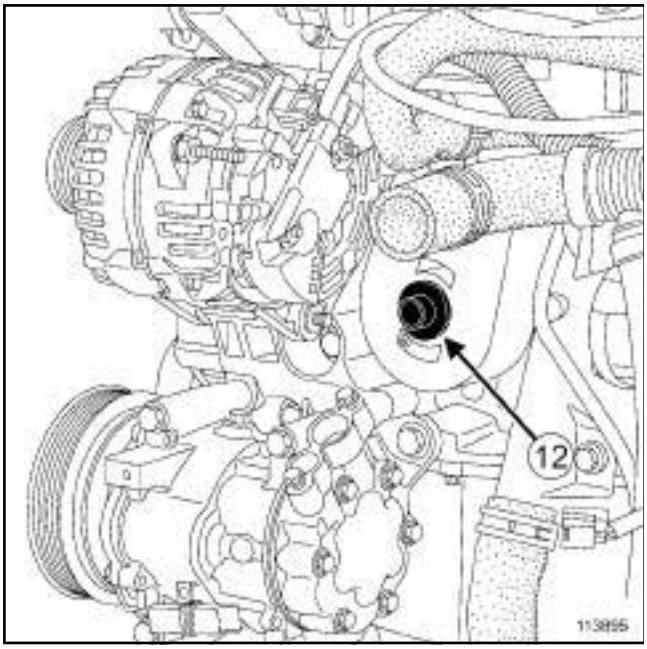
❏ Remove the oil filter support.



133518

❏ Remove the seal (**11**) from the oil filter support.

K9K, and 796



113895

❏ Remove:

- the bolt (**12**) from the oil-coolant heat exchanger,
- the oil-water heat exchanger.

❏ Using a clean cloth, clean up any oil and coolant runs on the cylinder block and on the oil filter support.

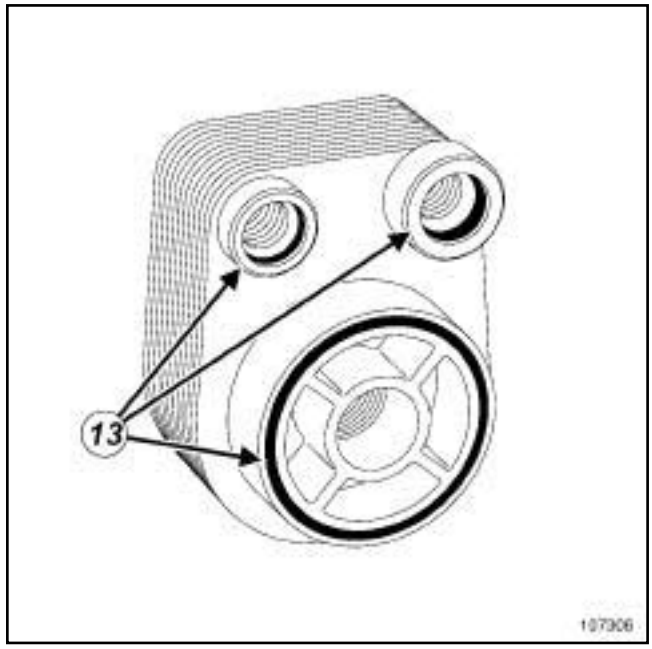
REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: coolant-engine oil heat exchanger seal on the cylinder block**.

❏ Always replace:

- the seals of the oil filter support bolt,
- the oil filter support seal.



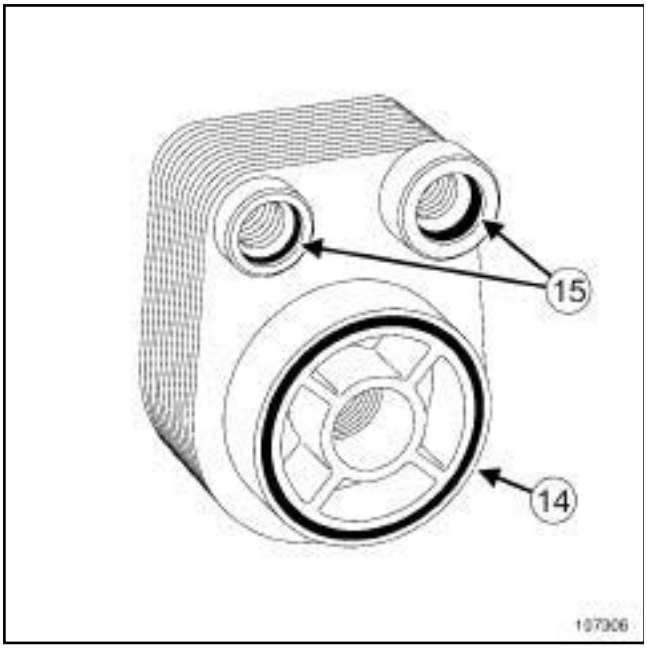
107306

❏ Remove the oil-water heat exchanger seals (**13**) .

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the housing of each seal in the oil-water heat exchanger if it is to be reused,
- the oil-coolant heat exchanger seal face if it is to be reused,
- the mating face of each seal on the coolant pump inlet pipe,
- the joint face on the cylinder block,
- the housing of each oil filter support seal,
- the housing of each seal in the oil filter support.

K9K, and 796



107306

❏ Refit new seals (**14**) and (**15**) on the oil-water heat exchanger.

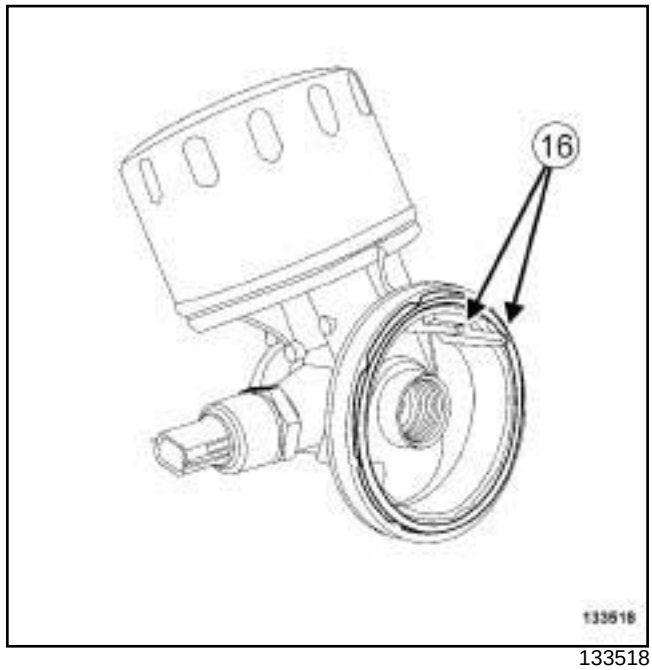
❏ Apply soapy water to the two seals ***(15)*** in contact with the coolant pump inlet pipe.

II - REFITTING OPERATION FOR PART CONCERNED

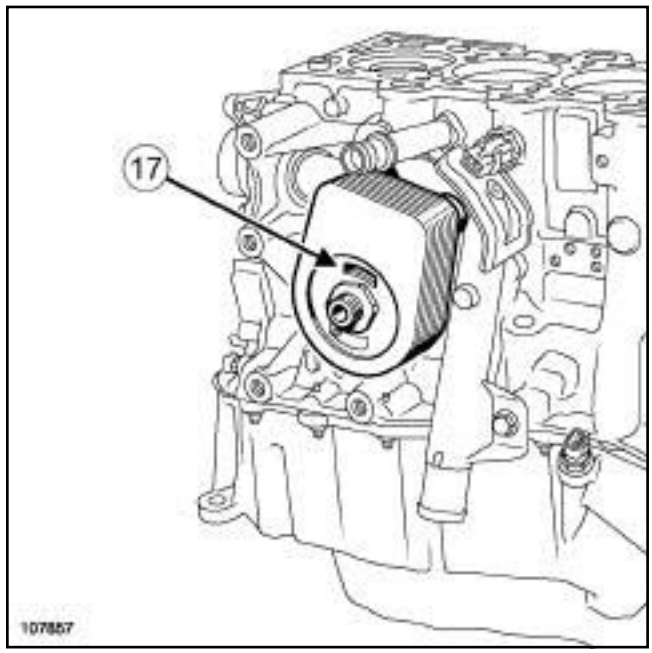
❏ Refit the oil-water heat exchanger.

❏ Torque tighten the **oil heat exchanger bolt (39 N.m)**.

III - FINAL OPERATION



133518



107857

❏ Refit:

- a new seal in the housing of the oil filter support,
- the oil filter support, positioning the lug (**16**) in the hole (**17**) of the oil-water heat exchanger.

❏ Refit the oil filter holder bolt.

❏ Torque tighten the **oil filter support bolt (28 N.m)**.

❏ Connect the oil pressure sensor connector.

❏ Refit the air outlet duct support on the fan assembly mounting.

K9K, and 796

❑ Connect the air outlet duct to the intercooler.

❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❑ Refit:

- the closure panel component under the diesel filter,
- the engine undertray,
- the engine cover.

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K9K

Tightening torques ▽	
oil pressure sensor	**33 N.m**

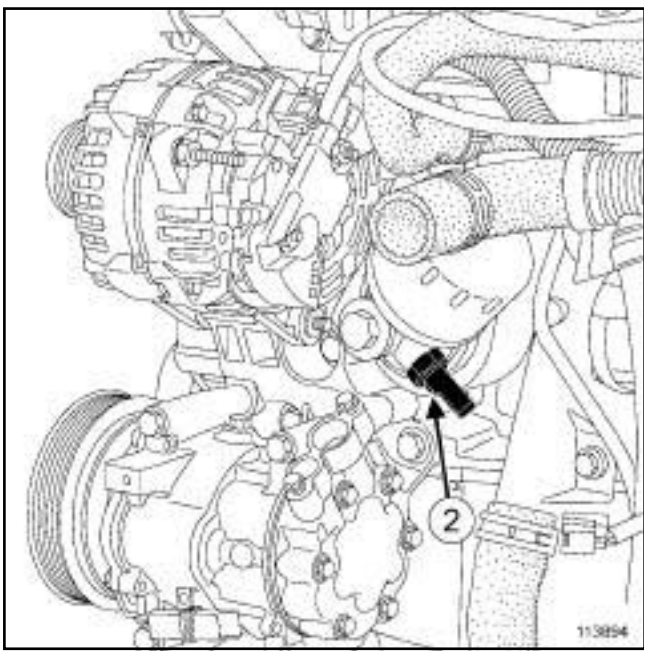
REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the engine undertray.

II - OPERATION FOR REMOVAL OF PART CONCERNED



113894

❏ Disconnect the oil pressure sensor connector.

❏ Remove the oil pressure sensor (**2**) using the.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the oil pressure sensor.

❏ Torque tighten the **oil pressure sensor (33 N.m)**.

❏ Connect the oil pressure sensor connector.

II - FINAL OPERATION

❏ Refit the engine undertray.

K4M

Tightening torques ▽	
oil pressure sensor	**35 N.m**

REMOVAL

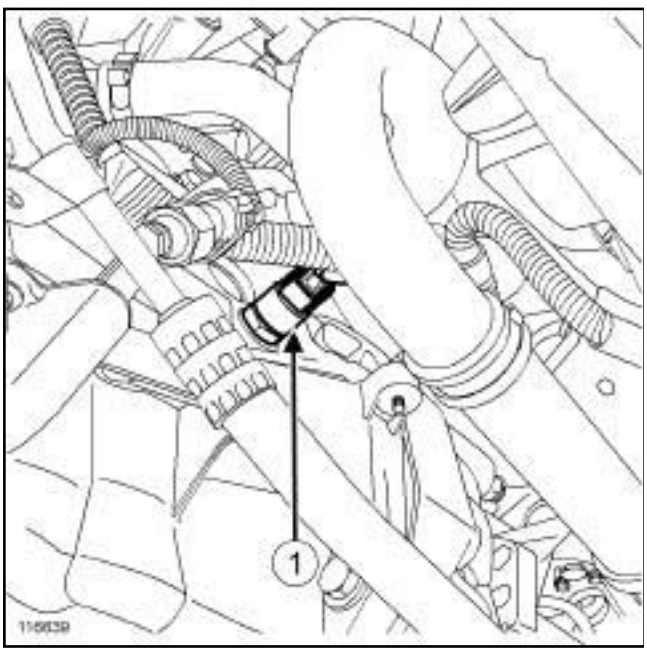
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION



116639

❏ Disconnect the oil pressure sensor connector (**1**) .

❏ Remove the oil pressure sensor.

REFITTING

I - REFITTING OPERATION

❏ Degrease the mating face of the oil pressure sensor on the cylinder block using **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❏ Refit the oil pressure sensor.

❏ Torque tighten the **oil pressure sensor (35 N.m)**.

II - FINAL OPERATION

❏ Connect the oil pressure sensor connector.

❏ Refit the engine undertray.

K9K

Tightening torques ▽	
oil pump bolts	**25 N.m**

REMOVAL

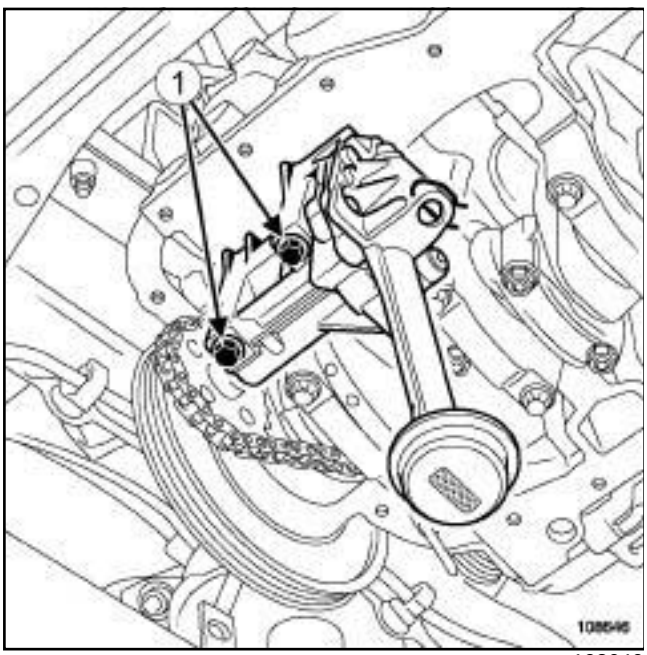
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

❏ Remove the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-9**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



108646

❏ Remove:

- the oil pump bolts (**1**) ,
- the oil pump.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Check for oil pump centering rings on the cylinder block.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the oil pump.

❏ Torque tighten the **oil pump bolts (25 N.m)**.

III - FINAL OPERATION

❏ Refit the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-9**) .

❏ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

K4M

Tightening torques ▽	
oil pump bolts	**25 N.m**

REMOVAL

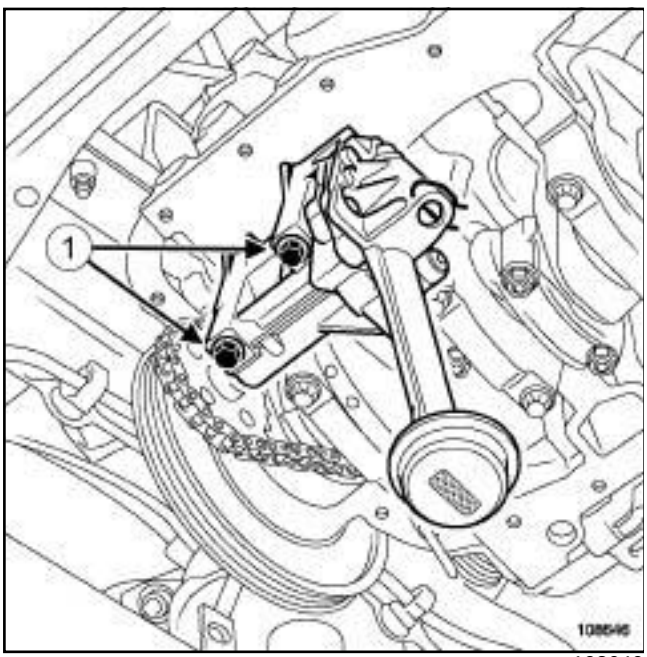
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Drain the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

❏ Remove the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-9**) .

II - REMOVAL OPERATION



108646

❏ Remove:

- the oil pump bolts (**1**) ,
- the oil pump.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Check for centering rings on the oil pump.

II - REFITTING OPERATION

❏ Refit the oil pump.

❏ Torque tighten the **oil pump bolts (25 N.m)**.

III - FINAL OPERATION

❏ Refit the sump (see **10A**, **Engine and cylinder block assembly**, **Lower cover: Removal - Refitting**, page **10A-9**) .

❏ Top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) .

K4M or K9K

Oil pressure tables:

Engine	Minimum oil pressure (bar)		Maximum oil pressure (bar)
	Idling speed	3000 rpm	3000 rpm
D4D, D4F	**1.5**	**3.9**	**5.3**
K7J, K7M	**1.3**	**3.7**	**5.0**

Engine	Minimum oil pressure (bar)		Maximum oil pressure (bar)
	Idling speed	4000 rpm	4000 rpm
K4M	**0.5**	**3.1**	**4.4**
K9K	**0.8**	**3.4**	**5.2**

End pieces to be used:

Engine	End pieces
D4D, D4F	**C + F**
K4M, K7J, K7M, K9K	**E + C + F**

I - REMOVAL PREPARATION OPERATION

❑

WARNING
Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

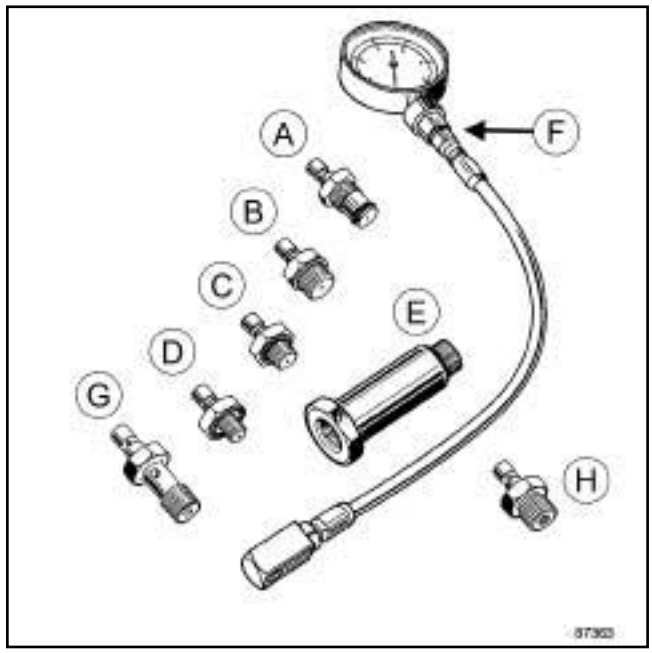
Correct the engine oil level if necessary before delivering the vehicle to the customer.

Note:

When topping up the engine oil, always leave at least **10 minutes** before checking the level with a dipstick.

II - CHECK

❑ Remove the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-42**) .



87363

❑ In place of the oil pressure sensor, fit thewith suitable adapters using theor a **22 mm** long socket.

❑ Start the vehicle.

❑ Monitor the engine oil pressure as the oil temperature rises (approximately **80°C** or the first time the engine cooling fan is activated); it should not be less than the pressure at idle speed.

❑ If the oil pressure is lower than the pressure at idle speed, check that:

- the oil filter is not clogged,
- dirt or swarf is not present in the engine oil,
- the oil pump is in good condition and being correctly driven.

❑ Check the oil pressure in comparison with the values given in the table above.

❑ Switch off the engine.

❑ Remove thewith the end pieces.

❑ Refit the oil pressure sensor (see **10A**, **Engine and cylinder block assembly**, **Oil pressure sensor: Removal - Refitting**, page **10A-42**) .

❑ Wipe any oil run-off with a cloth.

❑ Wait at least **10 minutes**.

❑ Check the oil level using the dipstick.

Oil pressure: Check

K4M or K9K

- ❏ Top up the engine oil level if necessary (see **Engine oil: Specifications**) .
- ❏ Start the vehicle and check that there are no oil leaks at the oil pressure sensor.

Tightening torques ▽	
multifunction support bolts on the cylinder block	**44 N.m**
lower bolt of the multifunction support on the sump	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch side liner,
- the injector rail protector,
- the engine undertray bolts,
- the engine undertray.

❏ Remove the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❏ Disconnect fuel supply pipe on the injector rail.

❏ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

❏ Remove (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering):

- the bolt from the power-assisted steering high pressure pipe on the cylinder block,
- the bolts from the power-assisted steering pump on the multifunction support (without opening the circuit).

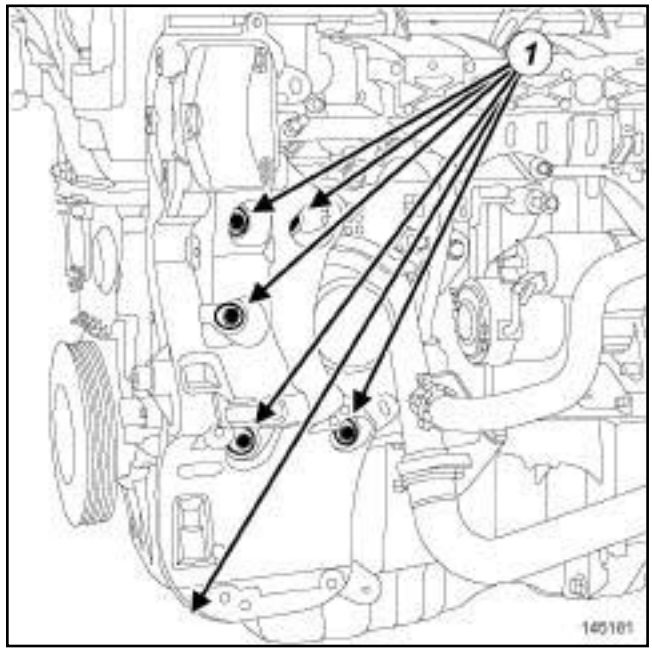
❏ Attach the power-assisted steering pump to the front end panel.

❏ Disconnect the connector from the air conditioning compressor.

❏ Remove the air conditioning compressor bolts (without opening the circuit) (see **Compressor: Removal - Refitting**) (62A, Air conditioning).

❏ Attach the air conditioning compressor to the subframe.

II - REMOVAL OPERATION



145181

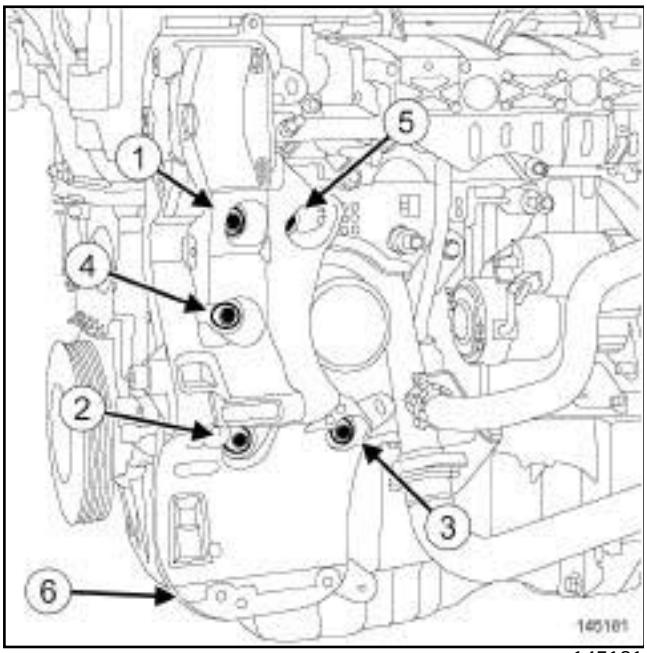
❏ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

K4M, and POWER ASSISTED STEERING, and AIR CONDITIONING

REFITTING

I - REFITTING OPERATION



145181

❑ Refit the multifunction support.

❑ Position bolts (**1**) to (**6**) without tightening them.

❑ Pretighten the multifunction support bolts (**1**) and (**2**) on the cylinder block **5 N.m**.

❑ Loosen bolts (**1**) and (**2**) of the multifunction support by one half-turn.

❑ Pretighten the multifunction support bolt (**6**) on the sump **5 N.m**.

❑ Pretighten the multifunction support bolts (**1**) and (**2**) on the cylinder block **5 N.m**.

❑ Pretighten in order (**3**) , (**4**) , (**5**) , (**6**) the multifunction support bolts on the cylinder block (**5 N.m**).

❑ Torque tighten in order (**1**) , (**2**) , (**3**) , (**4**) , (**5**) the **multifunction support bolts on the cylinder block (44 N.m)**.

❑ Torque tighten the **lower bolt of the multifunction support on the sump (25 N.m)** (**6**) .

II - FINAL OPERATION

❑ Refit the air conditioning compressor (see **Compressor: Removal - Refitting**) (62A, Air conditioning).

❑ Connect the air conditioning compressor connector.

❑ Refit (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering):

- the power-assisted steering pump,
- the bolt of the power-assisted steering high pressure pipe on the cylinder block.

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

❑ Connect the fuel supply pipe on the injector rail.

❑ Refit the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❑ Refit:

- the engine undertray,
- the injector rail protector.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M, and STANDARD HEATING RECIRCULATION

Tightening torques ▽	
multifunction support bolts on the cylinder block	**44 N.m**
multifunction support bolt on the sump	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch side liner,
- the engine undertray bolts,
- the engine undertray.

❏ Remove the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❏ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

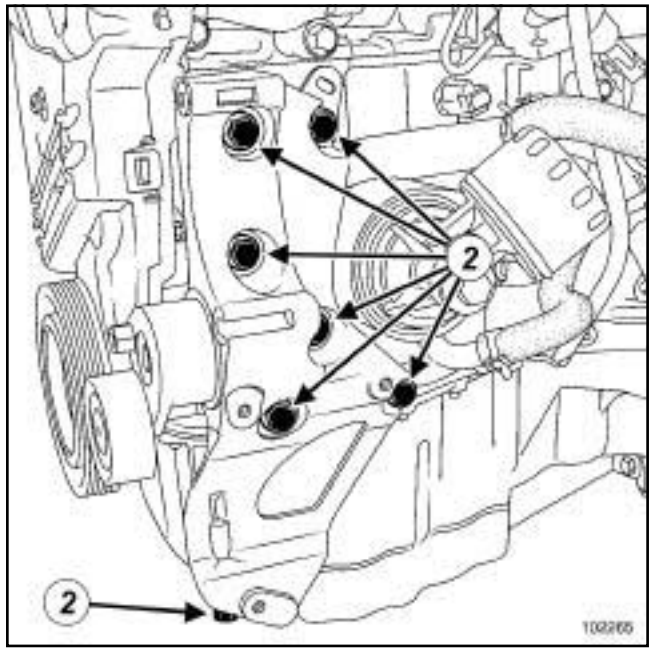
POWER ASSISTED STEERING

❏ Remove (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering):

- the power-assisted steering pump bolts,
- the high pressure pipe bolt on the cylinder block.

❏ Attach the power-assisted steering pump to the front end panel.

II - REMOVAL OPERATION



102265

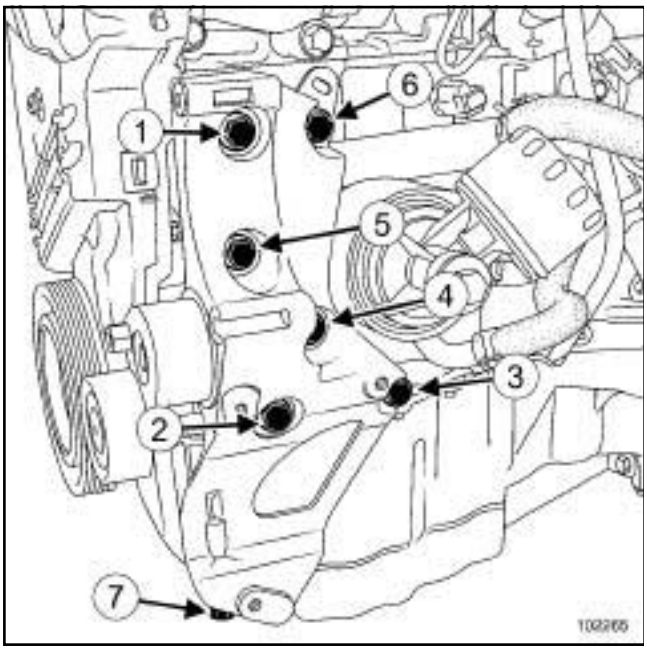
❏ Remove:

- the multifunction support bolts (**2**) ,
- the multifunction support.

K4M, and STANDARD HEATING RECIRCULATION

REFITTING

I - REFITTING OPERATION



102265

❏ Refit the multifunction support.

❏ Position bolts (**1**) to (**7**) without tightening them.

❏ Pretighten the multifunction support bolts (**1**) and (**2**) on the cylinder block **5 N.m**.

❏ Loosen bolts (**1**) and (**2**) a half-turn.

❏ Pretighten the multifunction support bolt (**7**) on the sump **5 N.m**.

❏ Pretighten the multifunction support bolts (**1**) and (**2**) on the cylinder block **5 N.m**.

❏ Pretighten the multifunction support bolts (**3**) , (**4**) , (**5**) , (**6**) on the cylinder block **5 N.m**.

❏ Torque tighten in order **(1), (2), (3), (4), (5), (6)** the **multifunction support bolts on the cylinder block (44 N.m)**.

❏ Torque tighten the **multifunction support bolt on the sump (25 N.m)** (**7**) .

II - FINAL OPERATION

POWER ASSISTED STEERING

❏ Refit (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering):

- the power-assisted steering pump,
- the power-assisted steering pump bolts,
- the high pressure pipe bolt on the cylinder block.

❏ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

❏ Refit the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❏ Refit the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Tightening torques ▽	
multifunction support bolts on the cylinder block	**44 N.m**
multifunction support bolt on the sump	**25 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch side liner,
- the engine undertray bolts,
- the engine undertray,
- the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

POWER ASSISTED STEERING, and STANDARD HEATING RECIRCULATION

❑ Remove the bolts from the power-assisted steering pump on the multifunction support (without opening the circuit) (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering).

❑ Attach the power-assisted steering pump to the front end panel.

AIR CONDITIONING

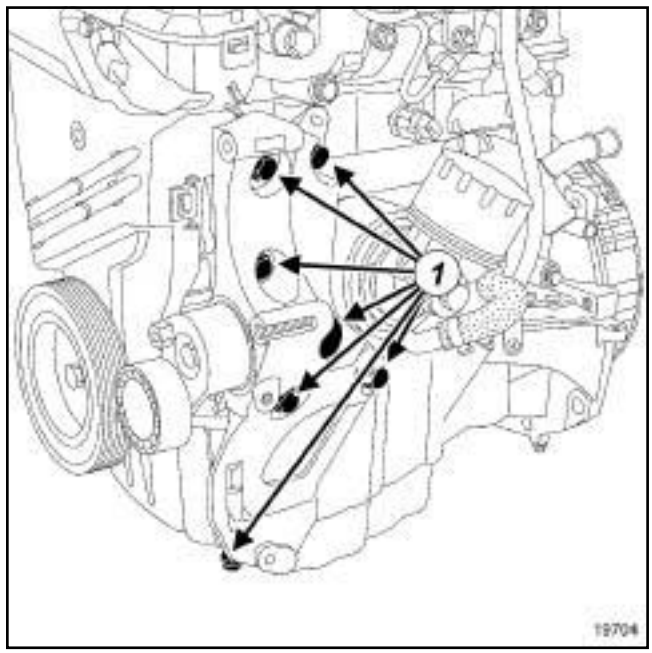
❑ Disconnect the air conditioning compressor connector.

❑ Remove the air conditioning compressor bolts (without opening the circuit) (see **Compressor: Removal - Refitting**) (62A, Air conditioning).

❑ Attach the air conditioning compressor to the lower front cross member.

❑ Unpick the wiring harness on the multifunction support.

II - REMOVAL OPERATION



19704

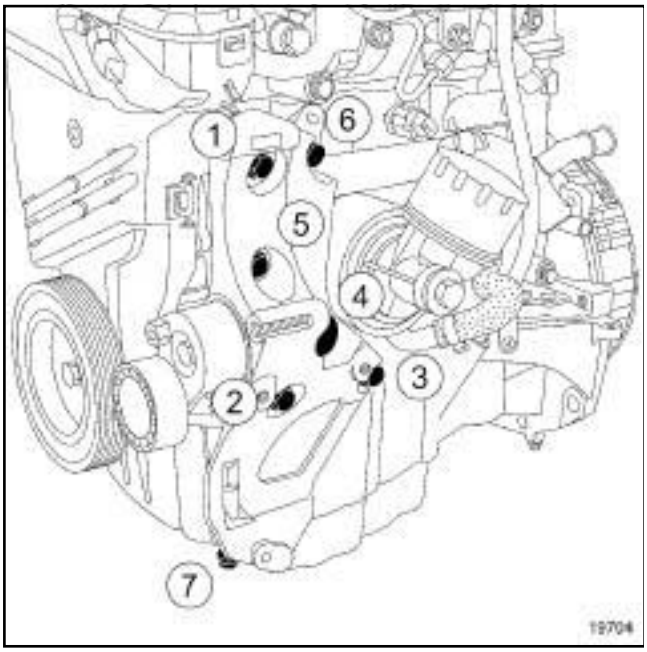
❑ Remove:

- the multifunction support bolts (**1**) ,
- the multifunction support.

K9K

REFITTING

REFITTING OPERATION



19704

- ❏ Refit the multifunction support.
- ❏ Position bolts (**1**) to (**7**) without tightening them.
- ❏ Pretighten the multifunction support bolts (**1**) and (**2**) on the cylinder block **5 N.m**.
- ❏ Loosen bolts (**1**) and (**2**) a half-turn.
- ❏ Pretighten the multifunction support bolt (**7**) on the sump **5 N.m**.
- ❏ Pretighten the multifunction support bolts (**1**) and (**2**) on the cylinder block **5 N.m**.
- ❏ Pretighten the multifunction support bolts (**3**) , (**4**) , (**5**) , (**6**) on the cylinder block **5 N.m**.
- ❏ Torque tighten in order (**1**) , (**2**) , (**3**) , (**4**) , (**5**) , (**6**) the **multifunction support bolts on the cylinder block (44 N.m)**.
- ❏ Torque tighten the **multifunction support bolt on the sump (25 N.m)** (**7**) .
- ❏ Proceed in the reverse order to removal.

K4M

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station

Tightening torques ▽	
nut on the rubber pad support of the left-hand suspended engine mounting	**62 N.m**
exhaust flange bolts	**21 N.m**
front axle subframe tie-rod upper bolts	**21 N.m**
anti-roll bar tie rod upper bolts	**37 N.m**
earth strap bolt on the gearbox	**21 N.m**
power-assisted steering low pressure pipe bolt on the front axle sub-frame	**21 N.m**
power-assisted steering pipe bolts on the gear-box support	**21 N.m**
power-assisted steering pipe bolts on the gear-box	**21 N.m**
power-assisted steering pipe bolt on the cylinder block	**21 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

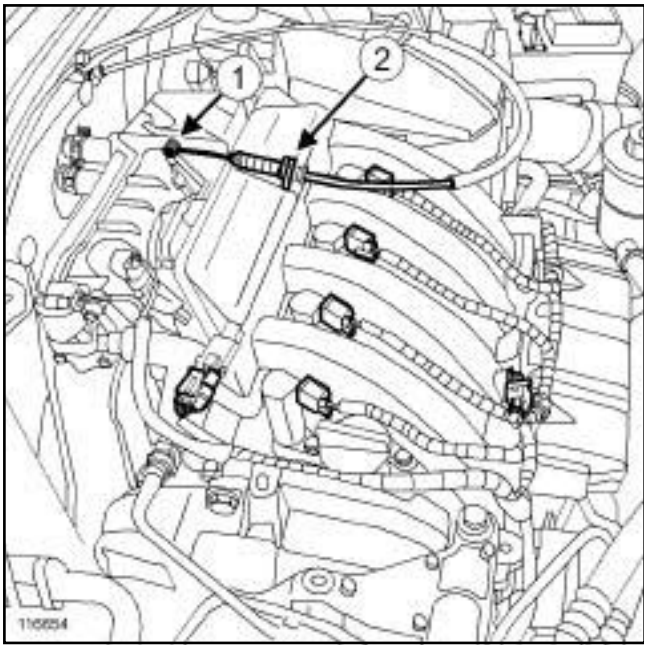
AIR CONDITIONING

❑ Drain the refrigerant circuit using the tool **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the air inlet sleeve,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the injector rail protector,
- the battery tray,
- the injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-7**) .

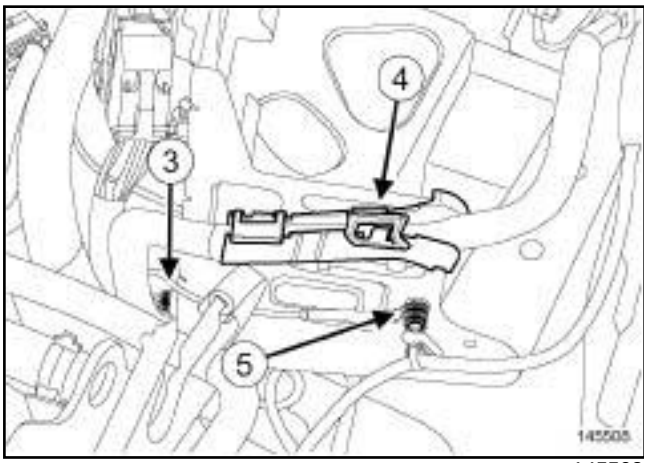
K4M



116654

❏ Disconnect the accelerator cable on the throttle valve at (**1**) .

❏ Remove the accelerator cable from the inlet distributor at (**2**) .

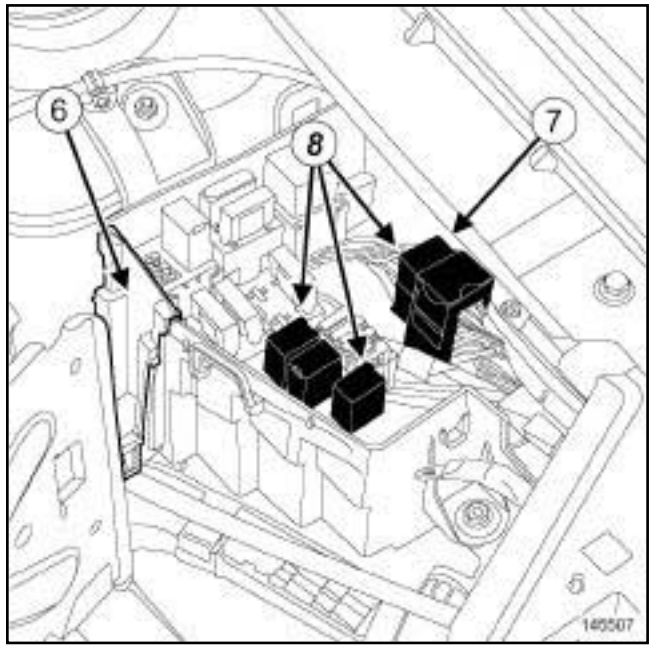


145508

❏ Remove the engine wiring bolt (**3**) on the battery mounting.

❏ Unclip the battery wiring at (**4**) .

❏ Remove the earth strap bolt (**5**) on the battery mounting.



145507

❏ Remove the fuse and relay box cover.

❏ Remove the side protector (**6**) of the fuse and relay box.

❏ Disconnect the engine harness - front wiring connector (**7**) .

❏ Unclip the engine harness fuse holders and relays (**8**) from their mountings on the fuse and relay box in the engine compartment.

❏ Position the engine harness, fuses and relays on the engine.

❏ Remove:

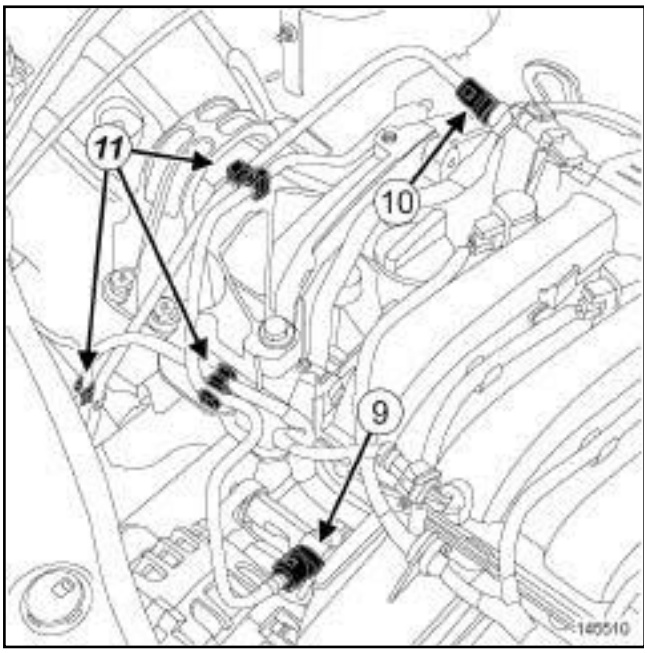
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray,
- the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection),
- the front wheel arch liners (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❏ Drain:

- the engine oil if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) ,
- the gearbox oil (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox),

K4M

- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .



145510

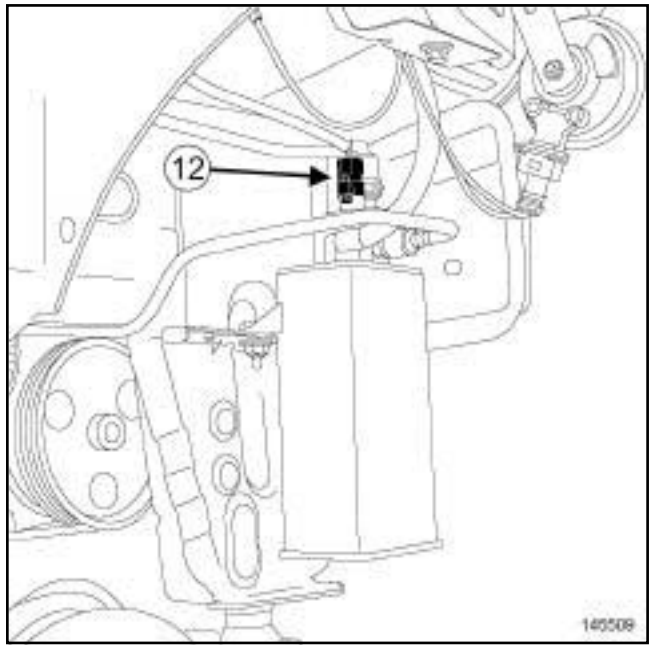
❏ Disconnect:

- the fuel supply pipe (**9**) on the injector rail,
- the petrol vapour rebreather pipe (**10**) .

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❏ Fit blanking plugs on the fuel supply pipe.

❏ Unclip the pipes at (**11**) .



145509

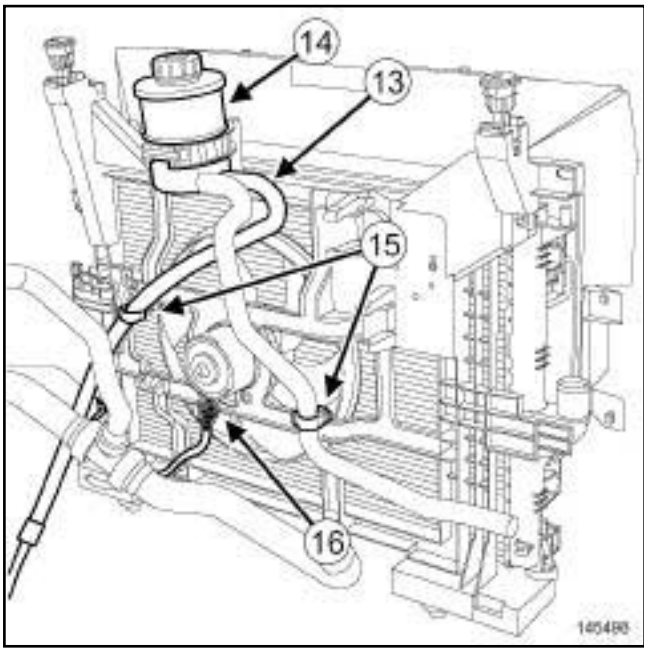
❏ Disconnect the connector (**12**) from the fuel vapour recirculation solenoid valve.

❏ Disconnect (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering):

- the power-assisted steering low pressure hose on the power-assisted steering pump using the **(Mot. 1448)** and drain the circuit,
- the power-assisted steering high pressure pipe on the power-assisted steering pump,
- the connector from the power-assisted steering pressure switch.

K4M

STANDARD HEATING RECIRCULATION



145498

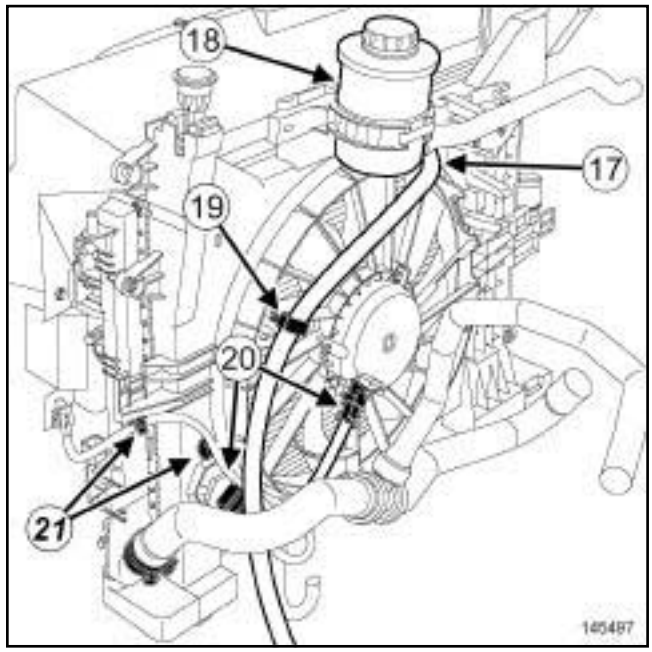
❏ Remove:

- the power-assisted steering low pressure pipe (**13**) on the oil reservoir using the **(Mot. 1448)**,
- the power assisted steering oil reservoir (**14**) ,
- the bolt of the power-assisted steering high pressure pipe on the cylinder block.

❏ Unclip the power-assisted steering pipes on the fan assembly mounting at (**15**) .

❏ Disconnect the fan assembly connector (**16**) .

AIR CONDITIONING



145497

❏ Remove:

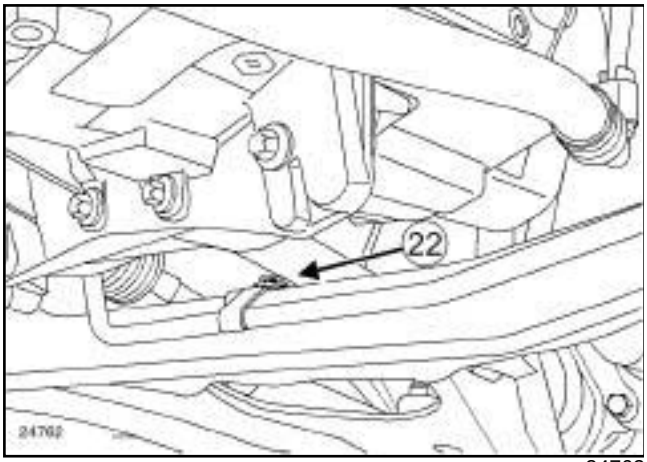
- the power-assisted steering low pressure pipe (**17**) on the oil reservoir using the **(Mot. 1448)**,
- the power assisted steering oil reservoir (**18**) ,
- the bolt of the power-assisted steering high pressure pipe on the cylinder block.

❏ Unclip the power-assisted steering pipes on the fan assembly mounting at (**19**) .

❏ Disconnect the connectors (**20**) from the fan assembly.

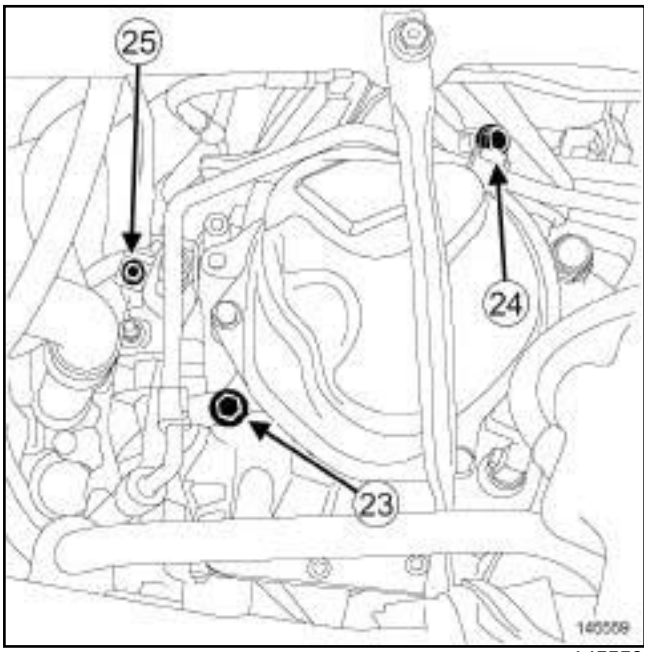
❏ Unclip the fan assembly wiring at (**21**) .

K4M



24762

❏ Remove the power-assisted steering low pressure pipe bolt (**22**) on the front axle subframe.



145559

❏ Remove:

- the power-assisted steering high pressure pipe bolt (**23**) on the gearbox,
- the power-assisted steering high pressure pipe bolt (**24**) on the gearbox support,
- the earth strap bolt (**25**) on the gearbox.

AIR CONDITIONING

❏ Remove (see **Compressor: Removal - Refitting**) (62A, Air conditioning):

- the pipe retaining bracket bolt on the compressor,
- the pipe union bolts on the compressor.

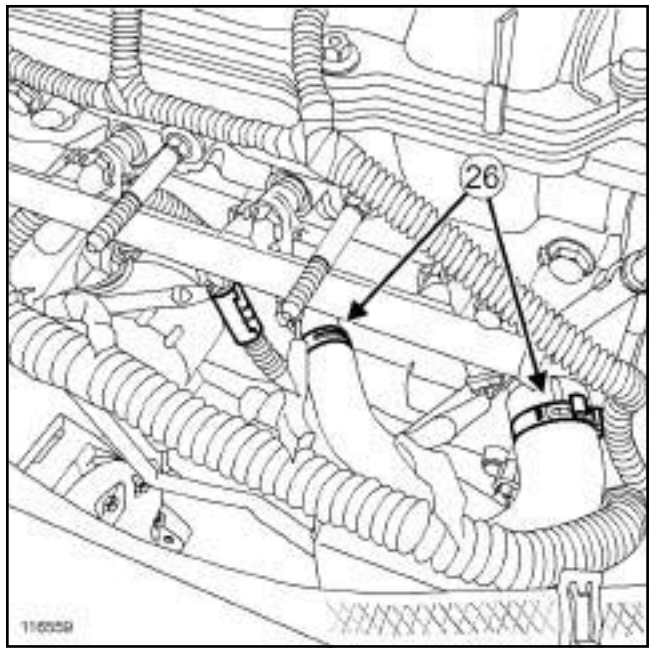
Note:

Plugs must be fitted on the hoses to prevent moisture from entering the system.

❏ Disconnect the compressor pipes.

❏ Fit blanking plugs in the pipe openings.

❏ Disconnect the air conditioning pressostat connector.



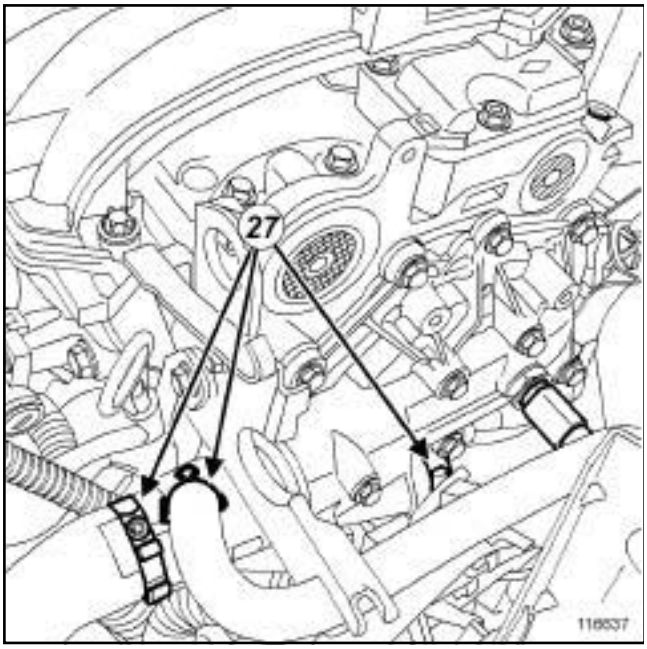
116559

❏ Move aside the cooling hose clips (**26**) on the coolant pump inlet pipe using the **(Mot. 1448)**.

❏ Disconnect:

- the cooling hoses on the coolant pump inlet pipe,
- the vacuum pipe on the inlet distributor chamber.

K4M



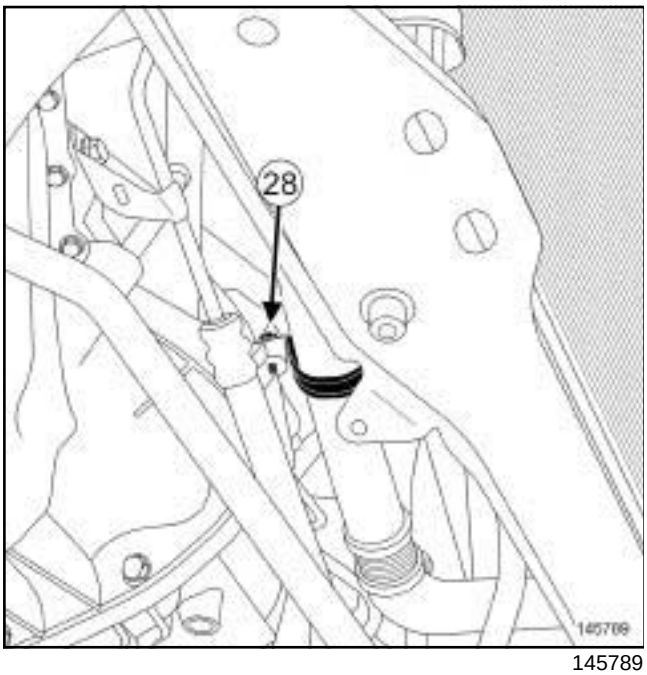
116637

❑ Move aside the clips (**27**) of the coolant hoses on the water chamber using the **(Mot. 1448)**.

❑ Disconnect the cooling hoses from the water chamber.

❑ Unclip the downstream oxygen sensor wiring on the steering box heat shield.

❑ Disconnect the downstream oxygen sensor connector.



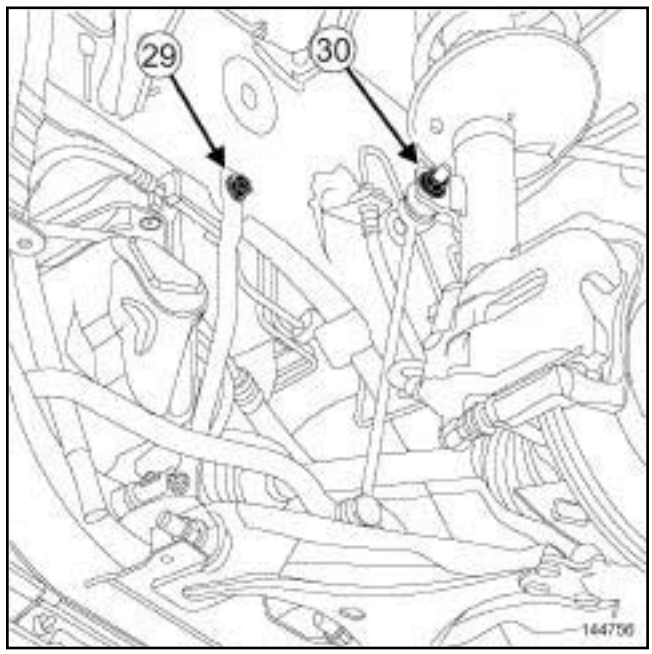
145789

❑ Remove the cooling pipe support bolt (**28**) on the sump.

❑ Remove (see) (36A, Steering assembly):

- the heat shield bolts on the steering box,
- the steering box heat shield,
- the steering box bolts on the front axle subframe.

❑ Attach the steering rack to the body.



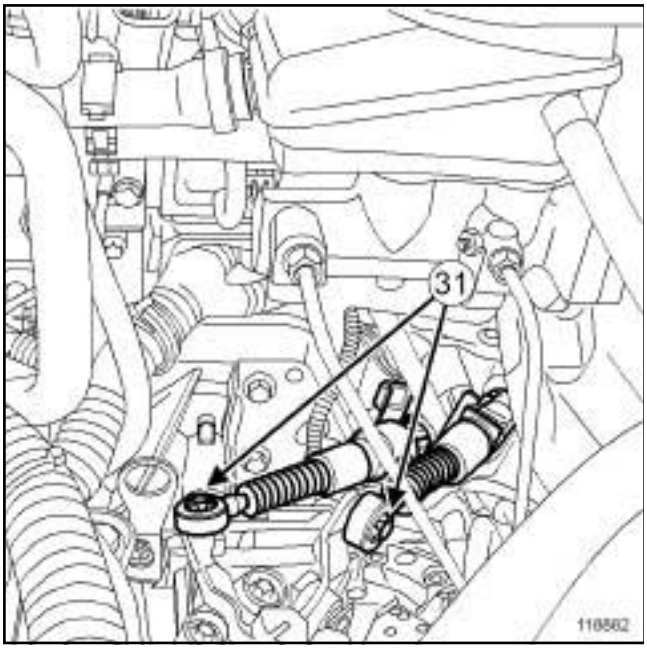
144756

❑ Remove:

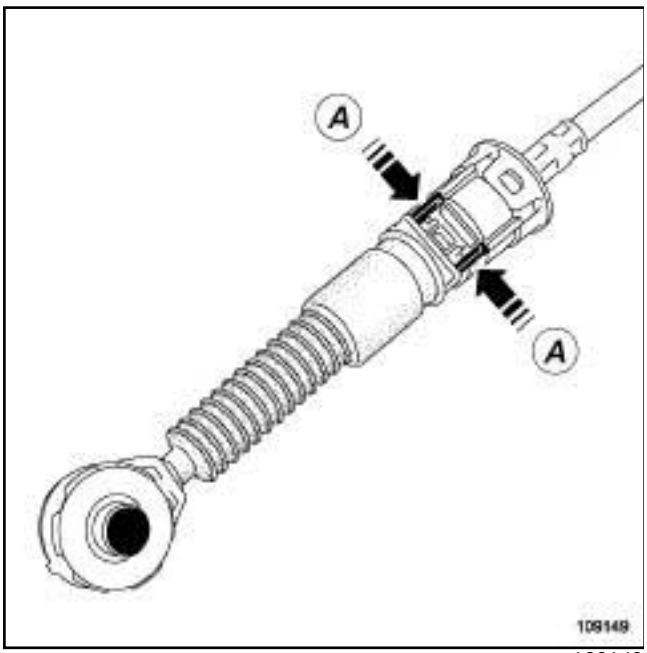
- the front axle subframe tie-rod upper bolts (**29**) ,
- the anti-roll bar tie rod upper bolts (**30**) ,
- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshaft),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Transmission).

❑ Pass the power-assisted steering low pressure pipe over the gearbox cover.

K4M



118882

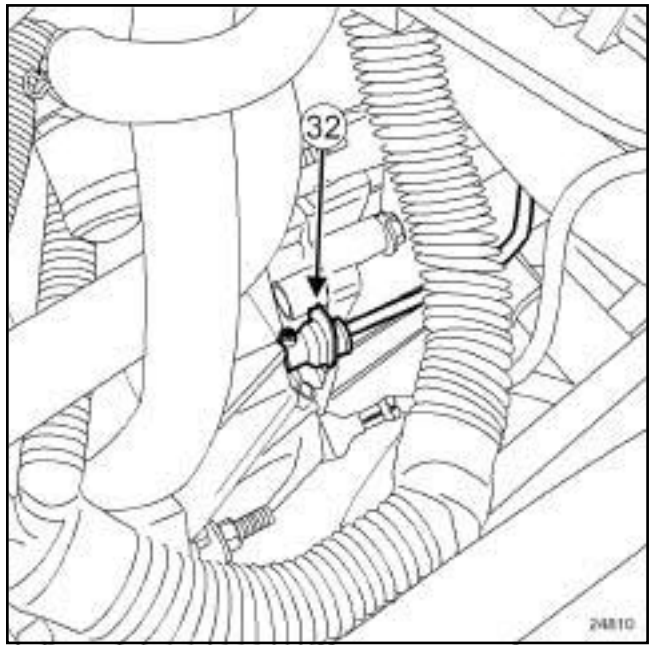


109149

❑ Unclip:

- the gear control cables on the gearbox at (**31**) using a screwdriver,
- the gear control cables from the sleeve stops by pressing at (**A**) .

❑ Move the gear control cables away from the gearbox.



24810

❑

WARNING

Do not pull the clip. If it is incorrectly handled in any way, the pipe will need to be replaced.

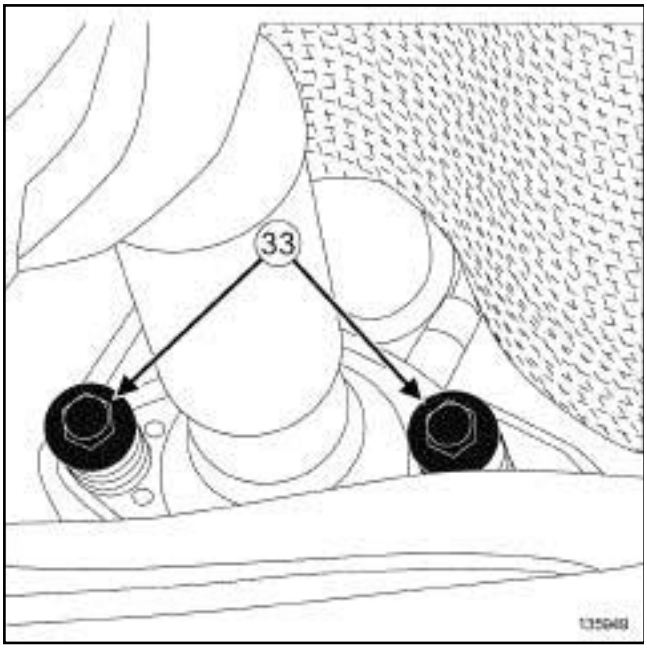
❑ Disconnect the clutch control pipe on the clutch slave cylinder by pressing the clip (**32**) .

❑ Recover the brake fluid in a container.

❑ Fit blanking plugs on the pipe openings.

❑ Remove the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .

K4M



135949

❏ Remove:

- the bolts (**33**) from the exhaust flange,
- the exhaust bracket ring.

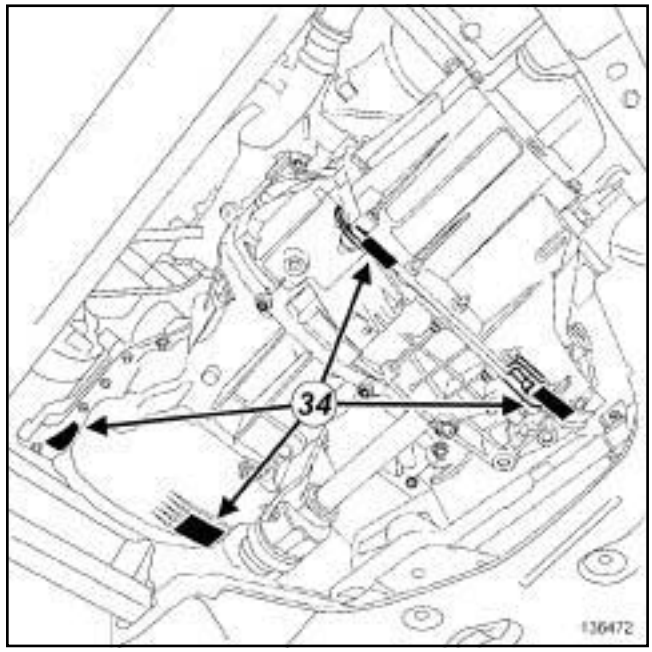
❏ Move aside the exhaust pipe.

Note:

Pull the exhaust pipe backwards.

❏ Remove the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components).

II - REMOVAL OPERATION



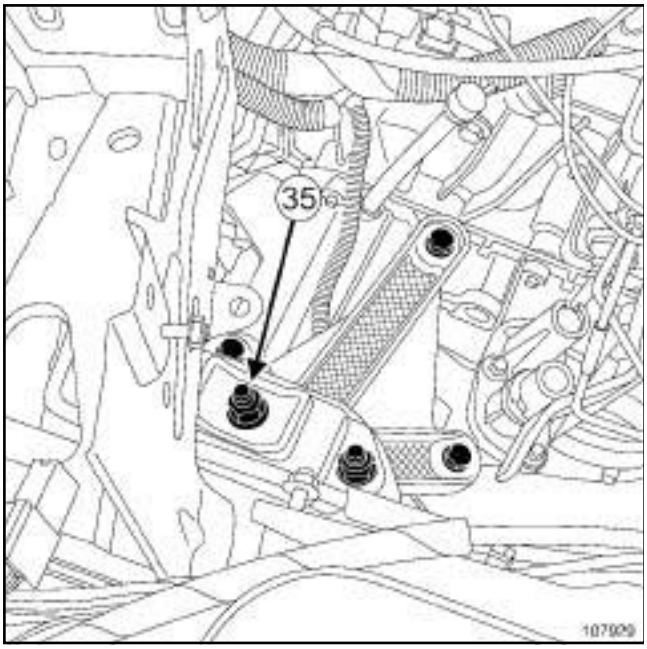
136472

❏ Mark the positions of the suspended engine mountings on the body.

❏ Support the engine - gearbox assembly on the engine marks (**34**) using the **(Mot. 1390)**.

❏ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) .

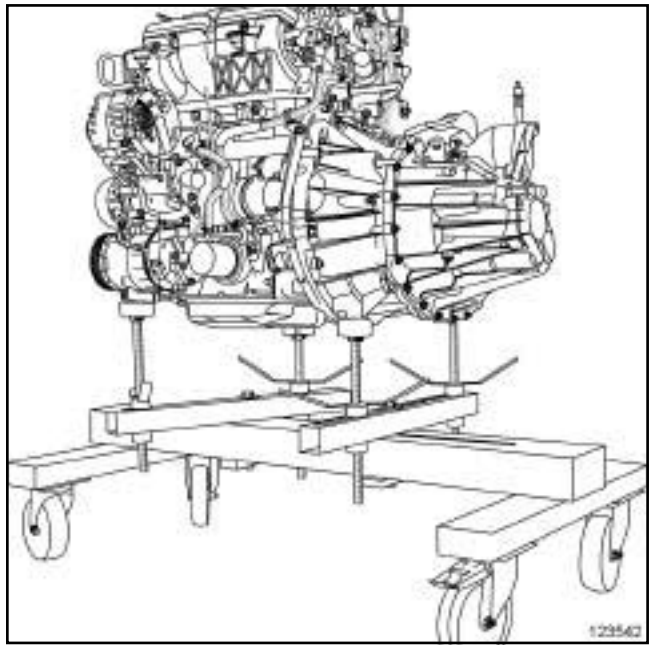
K4M



107929

❑ Remove the nut (**35**) on the rubber pad support of the left-hand suspended engine mounting.

❑ Strike the gearbox stud with a copper hammer to separate the engine - gearbox assembly from the body.


123542

❑ Lift the vehicle to remove the engine - gearbox assembly.

Note:

Ensure that no component obstructs the movement of the body around the engine - gearbox assembly.

❑ Remove the engine - gearbox assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ For standard engine replacements (see **Engine: Standard replacement**) (Technical Note 6006A, 10A, Engine and peripherals).

❑ **parts always to be replaced: ring between exhaust manifold and catalytic converter**

II - REFITTING OPERATION

❑ Fit the engine - gearbox assembly.

❑ Refit the nut on the rubber pad support of the left-hand suspended engine mounting.

❑ Torque tighten the **nut on the rubber pad support of the left-hand suspended engine mounting (62 N.m)**.

❑ Refit the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) .

K4M

❑ Remove the **(Mot. 1390)** from the engine - gearbox assembly.

III - FINAL OPERATION

❑ Proceed in the reverse order to removal.

❑ Torque tighten:

- the **exhaust flange bolts (21 N.m)**,
- the **front axle subframe tie-rod upper bolts (21 N.m)**,
- the **anti-roll bar tie rod upper bolts (37 N.m)**,
- the **earth strap bolt on the gearbox (21 N.m)**,
- the **power-assisted steering low pressure pipe bolt on the front axle subframe (21 N.m)**,
- the **power-assisted steering pipe bolts on the gearbox support (21 N.m)**,
- the **power-assisted steering pipe bolts on the gearbox (21 N.m)**,
- the **power-assisted steering pipe bolt on the cylinder block (21 N.m)**.

❑ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) ,
- fill up the gearbox oil (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox),
- fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) ,
- bleed the clutch circuit (see **Clutch circuit: Bleed**) (37A, Mechanical component controls).

AIR CONDITIONING

❑ Fill the refrigerant circuit using the tool **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Fill up the power-assisted steering circuit.

❑ First, bleed the power-assisted steering circuit by turning the steering wheel fully from left to right with the engine off.

❑ Bleed the power-assisted steering circuit by turning the steering wheel fully from lock to lock with the engine running.

❑ Top up the oil in the power-assisted steering oil reservoir.

❑ Check that there are no leaks.

K9K, and 796

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Mot. 1390	Support for removal - refitting of engine - gearbox assembly

Equipment required
refrigerant charging station

Tightening torques ▽	
nut on the rubber pad support of the left-hand suspended engine mounting	**62 N.m**
exhaust flange bolts	**21 N.m**
front axle subframe tie-rod upper bolts	**21 N.m**
anti-roll bar tie rod upper bolts	**37 N.m**
earth strap bolt on the gearbox	**21 N.m**
power-assisted steering low pressure pipe bolt on the front axle sub-frame	**21 N.m**
power-assisted steering pipe bolts on the gear-box support	**21 N.m**
power-assisted steering pipe bolts on the gear-box	**21 N.m**
power-assisted steering pipe bolt on the cylinder block	**21 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑

IMPORTANT
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

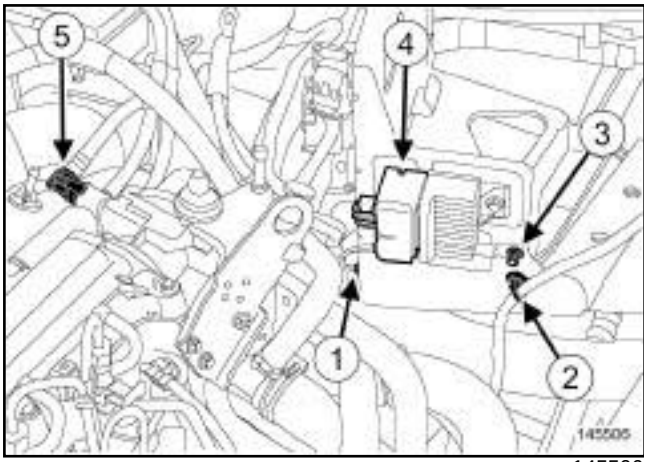
AIR CONDITIONING

❑ Drain the refrigerant circuit using the tool **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Remove:

- the engine cover,
- the air inlet sleeve,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray,
- the injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-7**) .

K9K, and 796



145506

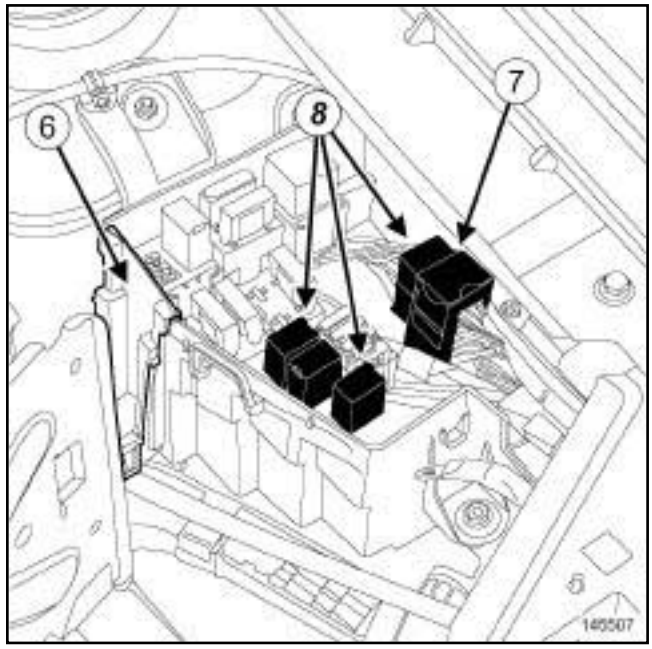
❏ Remove the engine wiring bolt (**1**) on the battery mounting.

❏ Unclip the battery wiring at (**2**) .

❏ Remove the earth strap bolt (**3**) on the battery mounting.

❏ Disconnect the connector (**4**) from the pre-postheating unit.

❏ Disconnect the non-return valve (**5**) at the vacuum pump.



145507

❏ Remove the fuse and relay box cover.

❏ Remove the side protector (**6**) of the fuse and relay box.

❏ Disconnect the engine harness - front wiring connector (**7**) .

❏ Unclip the engine harness fuse holders and relays (**8**) from their mountings on the fuse and relay box in the engine compartment.

❏ Position the engine harness, fuses and relays on the engine.

❏ Remove:

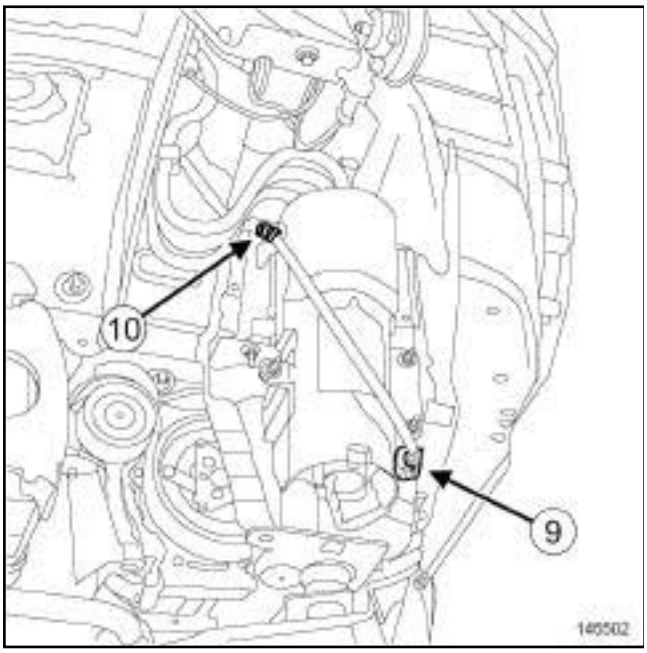
- the front wheels (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the engine undertray bolts,
- the engine undertray,
- the front bumper (see **Front bumper assembly: Exploded view**) and (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection),
- the front wheel arch liners (see **Exterior body front trim assembly: Exploded view**) (55A, Exterior protection).

❏ Drain:

- the engine oil if necessary (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) ,
- the gearbox oil (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox),

K9K, and 796

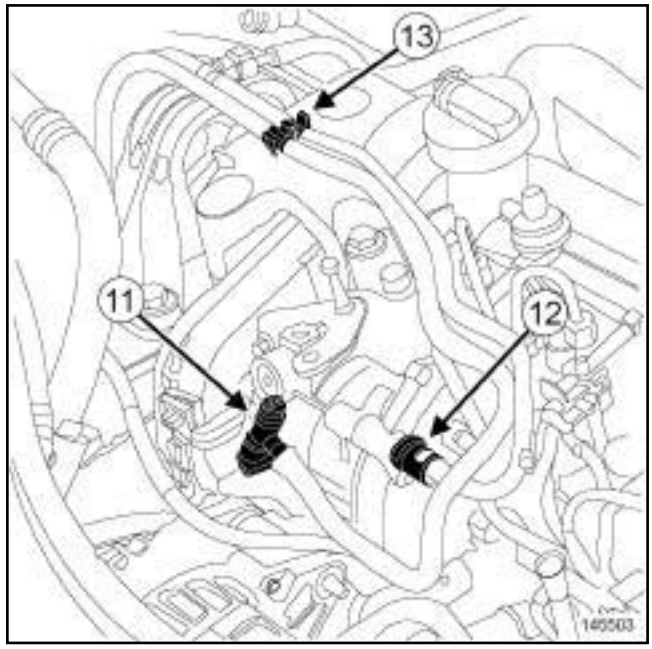
- the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .



145502

❑ Disconnect the connector (**9**) from the water detection sensor on the diesel filter.

❑ Unclip the water detection connector on the diesel filter mounting at (**10**) .



145503

❑ Disconnect:

- the fuel supply pipe (**11**) ,
- the fuel return pipe (**12**) .

WARNING

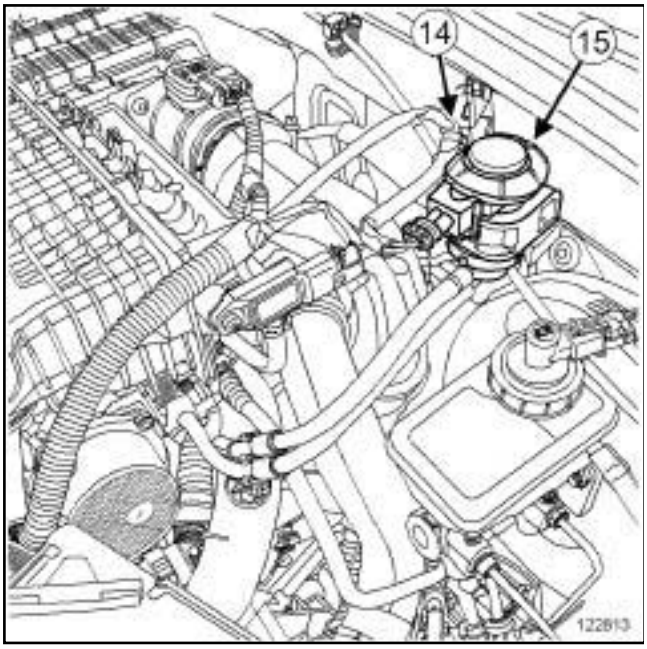
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❑ Fit blanking plugs on the fuel supply pipe.

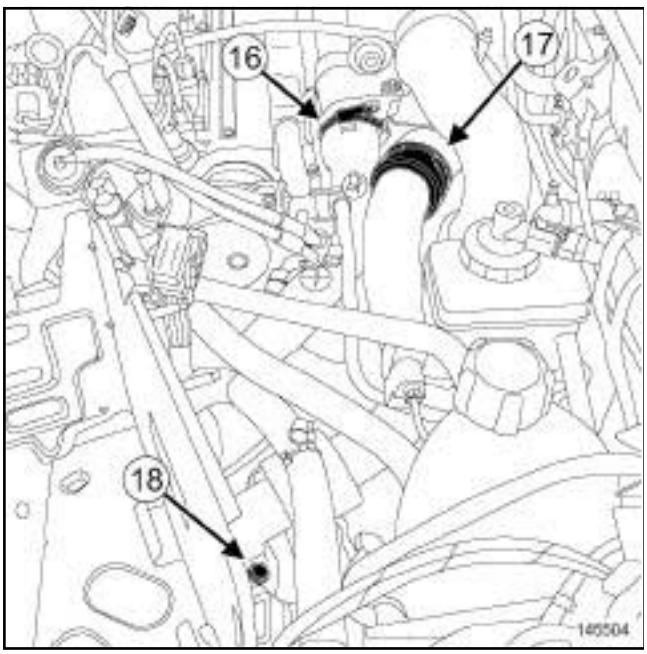
❑ Unclip the pipes at (**13**) .

❑ Disconnect the intercooler ducts (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-8**) .

K9K, and 796



122813



145504

❑ Unclip:

- the turbocharger control solenoid valve wiring at (**14**) ,
- the turbocharger control solenoid valve (**15**) from its support.

❑ Disconnect:

- the air duct (**16**) on the EGR assembly,
- the air duct between the turbocharger and the intercooler at (**17**) .

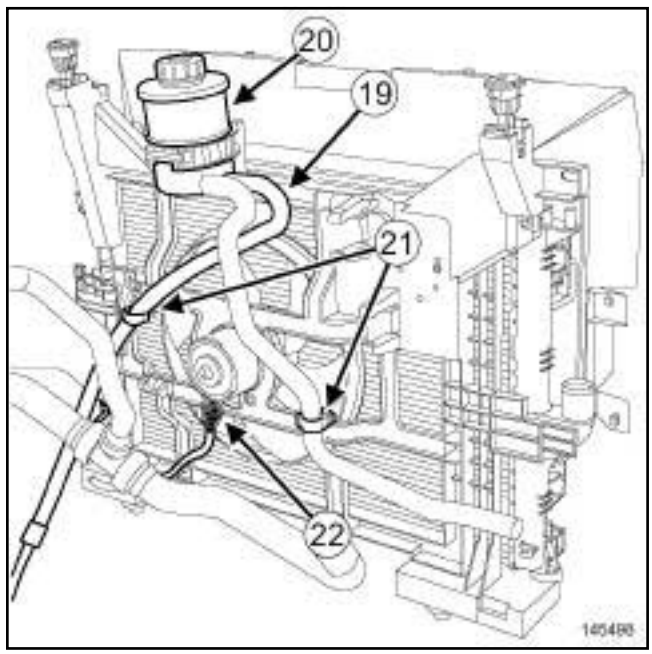
❑ Remove:

- the air duct nut (**18**) on the gearbox,
- the intercooler air ducts.

❑ Disconnect (see **Power-assisted steering pump: Removal - Refitting**) (36B, Power-assisted steering):

- the power-assisted steering low pressure hose on the power-assisted steering pump using the **(Mot. 1448)** and drain the circuit,
- the power-assisted steering high pressure pipe on the power-assisted steering pump,
- the connector from the power-assisted steering pressure switch.

STANDARD HEATING RECIRCULATION



145498

❑ Remove:

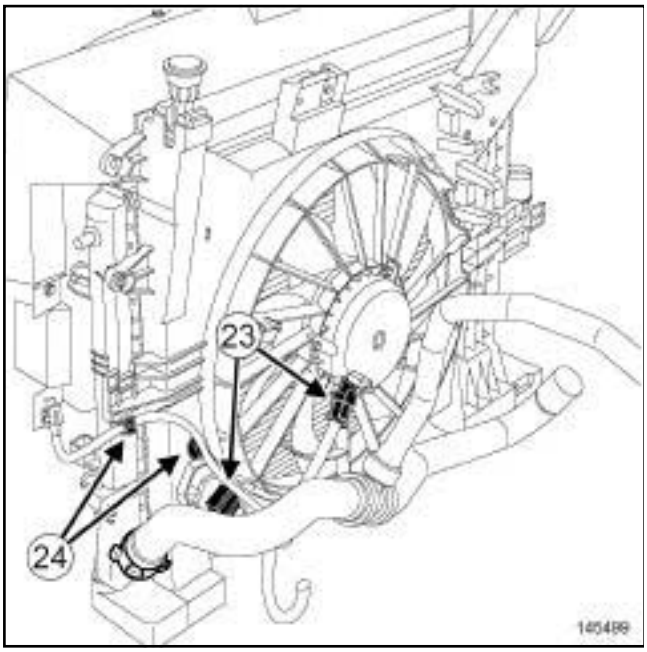
- the power-assisted steering low pressure pipe (**19**) on the oil reservoir using the **(Mot. 1448)**,
- the power assisted steering oil reservoir (**20**) ,
- the bolt of the power-assisted steering high pressure pipe on the cylinder block.

❑ Unclip the power-assisted steering pipes on the fan assembly mounting at (**21**) .

❑ Disconnect the fan assembly connector (**22**) .

K9K, and 796

AIR CONDITIONING

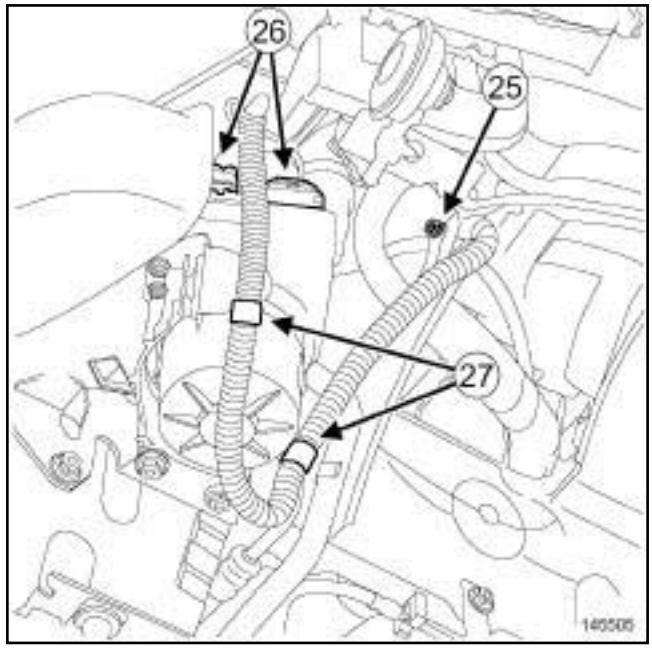


145499

❏ Remove the power-assisted steering high pressure pipe bolt on the cylinder block.

❏ Disconnect the connectors (**23**) from the fan assembly.

❏ Unclip the fan assembly wiring at (**24**) .

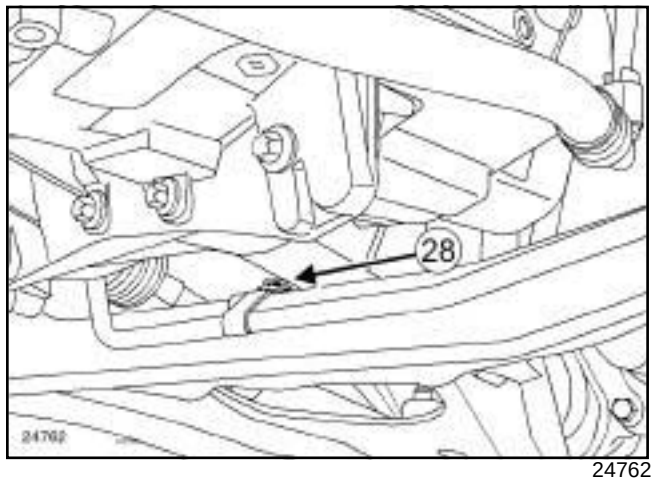


145505

❏ Remove the earth strap bolt (**25**) on the body.

❏ Disconnect the pump assembly connectors (**26**) .

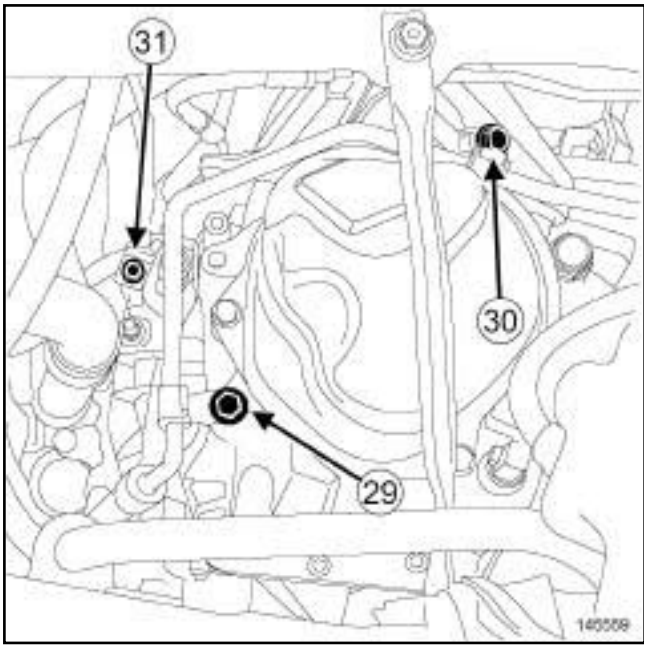
❏ Unclip the pump assembly wiring at (**27**) .



24762

❏ Remove the power-assisted steering low pressure pipe bolt (**28**) on the front axle subframe.

K9K, and 796



145559

❏ Remove:

- the power-assisted steering high pressure pipe bolt (**29**) on the gearbox,
- the power-assisted steering high pressure pipe bolt (**30**) on the gearbox support,
- the earth strap bolt (**31**) on the gearbox.

AIR CONDITIONING

❏ Remove the bolts from the pipe unions on the compressor.

❏ Disconnect the compressor pipes.

Note:

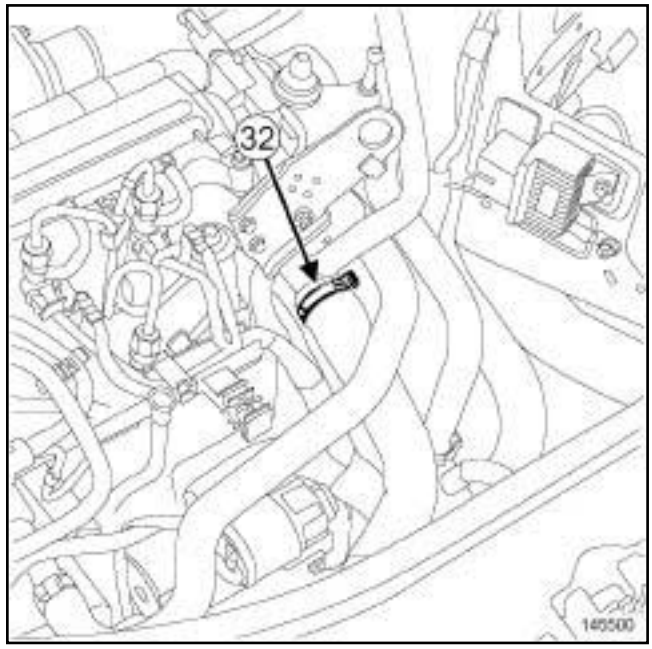
Plugs must be fitted on the hoses to prevent moisture from entering the system.

❏ Fit blanking plugs in the pipe openings.

❏ Disconnect the air conditioning pressostat connector.

❏ Remove the expansion bottle nuts.

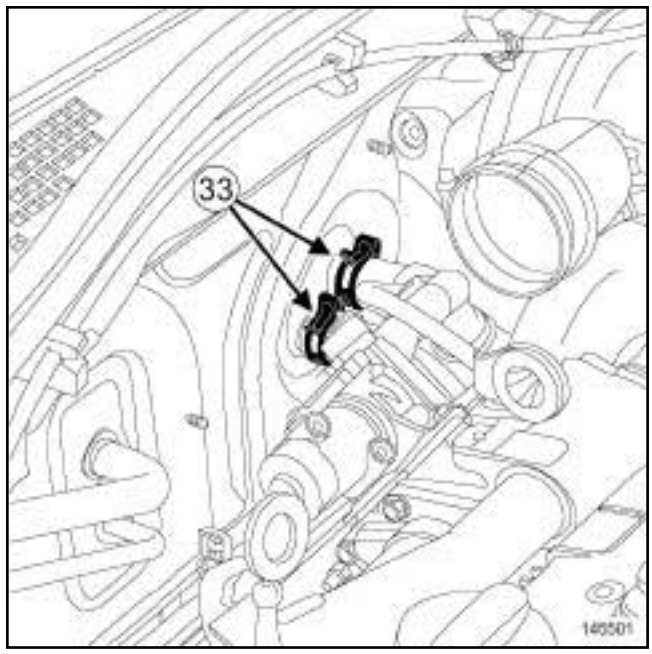
❏ Move aside the expansion bottle.



145500

❏ Move aside the cooling hose clip (**32**) on the water chamber using the **(Mot. 1448)**.

❏ Disconnect the cooling hose on the water chamber.



145501

❏ Move aside the cooling hose clips (**33**) on the heating radiator using the **(Mot. 1448)**.

❏ Disconnect the cooling hoses on the heating radiator.

❏ Remove the cooling hoses from their mountings.

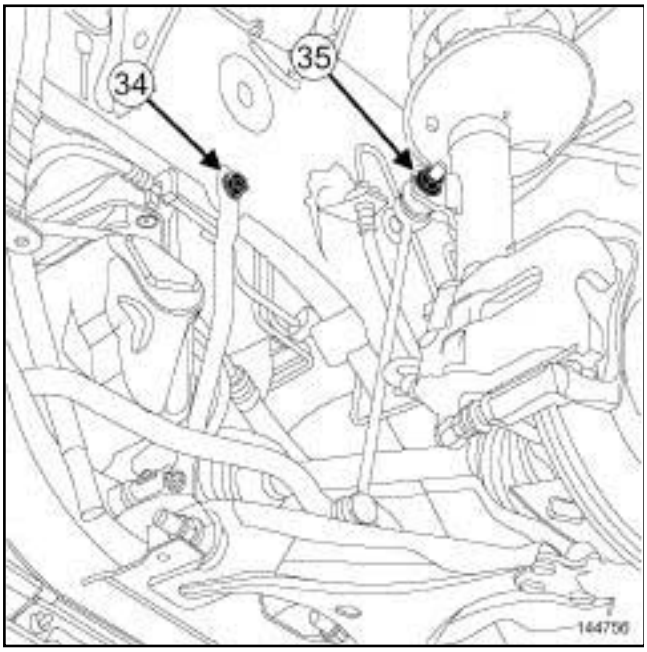
❏ Remove (see) (36A, Steering assembly):

- the steering box heat shield bolts,

K9K, and 796

- the steering box heat shield,
- the steering box bolts on the front axle subframe.

❏ Attach the steering rack to the body.



144756

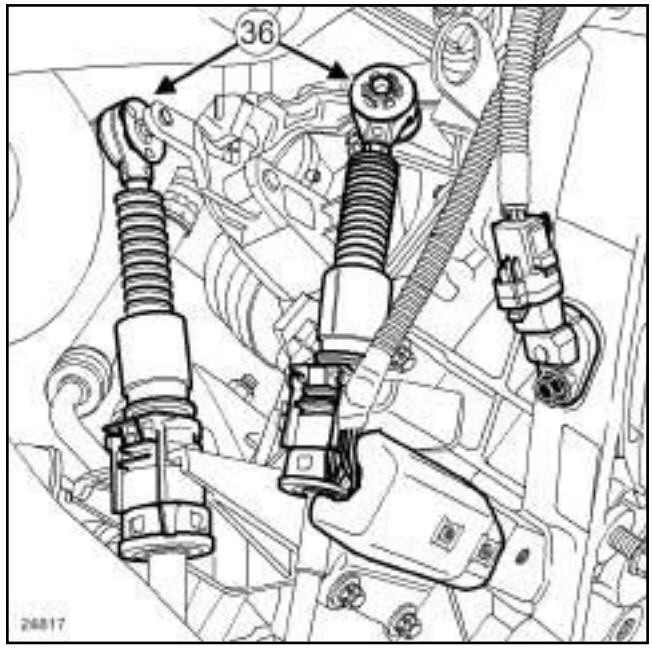
❏ Remove:

- the front axle subframe tie-rod upper bolts (**34**) ,
- the anti-roll bar tie rod upper bolts (**35**) .

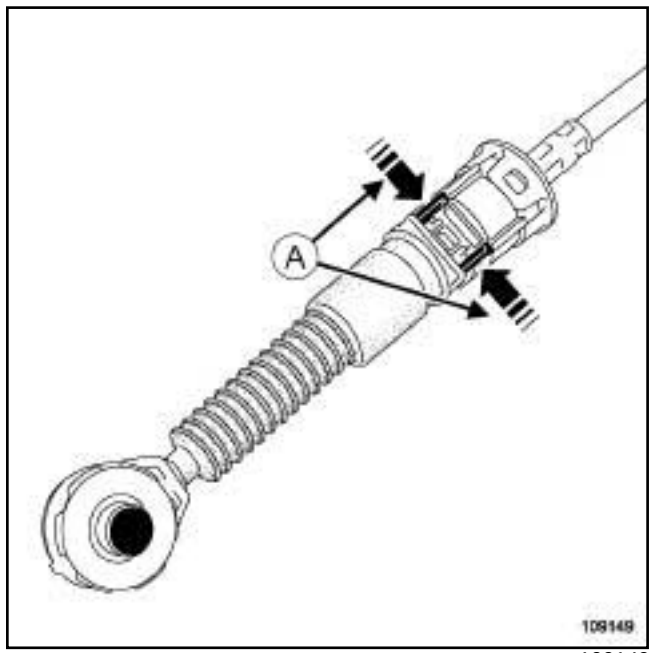
❏ Remove:

- the front right-hand wheel driveshaft (see **Front right-hand driveshaft: Removal - Refitting**) (29A, Driveshaft),
- the front left-hand wheel driveshaft (see **Front left-hand driveshaft: Removal - Refitting**) (29A, Transmission).

❏ Pass the power-assisted steering low pressure pipe over the gearbox cover.



24817



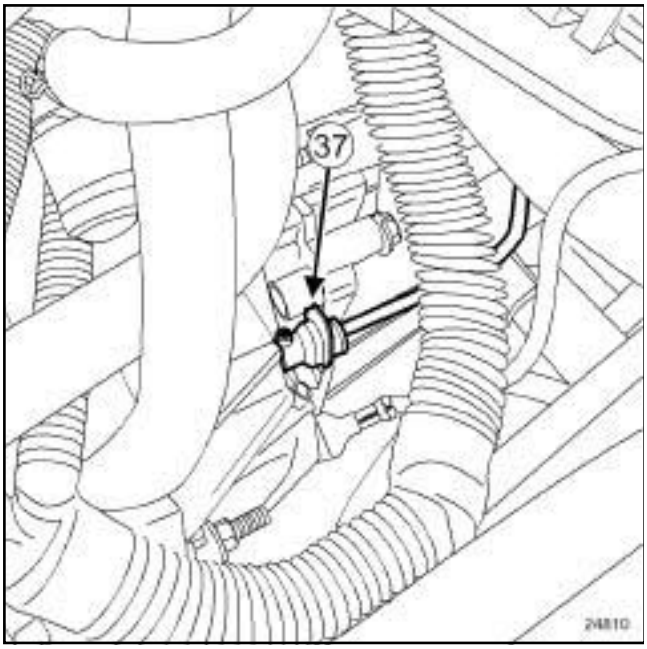
109149

❏ Unclip:

- the gear control cables on the gearbox at (**36**) using a screwdriver,
- the gear control cables from the sleeve stops by pressing at (**A**) .

❏ Move the gear control cables away from the gearbox.

K9K, and 796



24810

❏

WARNING

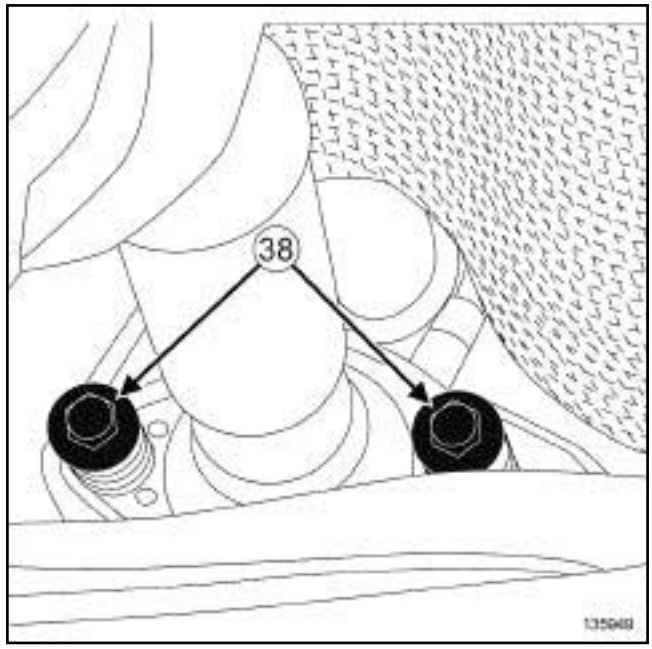
Do not pull the clip. If it is incorrectly handled in any way, the pipe will need to be replaced.

❏ Disconnect the clutch control pipe on the clutch slave cylinder by pressing the clip (**37**) .

❏ Recover the brake fluid in a container.

❏ Fit blanking plugs in the pipe openings.

❏ Remove the lower engine tie-bar (see **19D**, **Engine mounting**, **Lower engine tie-bar: Removal - Refitting**, page **19D-8**) .



135949

❏ Remove:

- the bolts (**38**) from the exhaust flange,
- the exhaust bracket ring.

❏ Move aside the exhaust pipe.

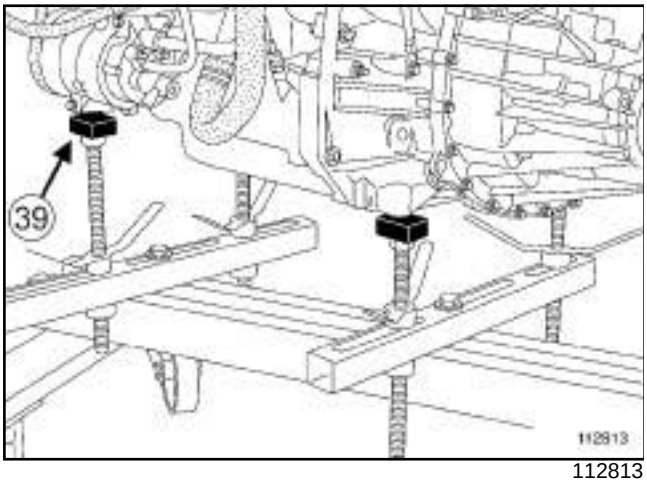
Note:

Pull the exhaust pipe backwards.

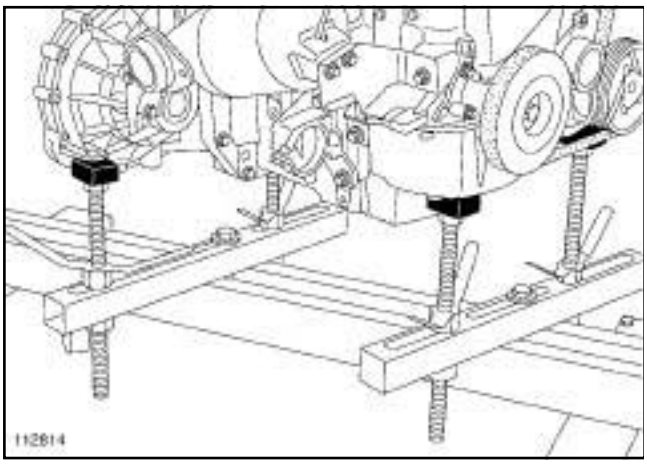
❏ Remove the front axle subframe (see **Front axle subframe: Removal - Refitting**) (31A, Front axle components).

K9K, and 796

II - REMOVAL OPERATION



112813



112814

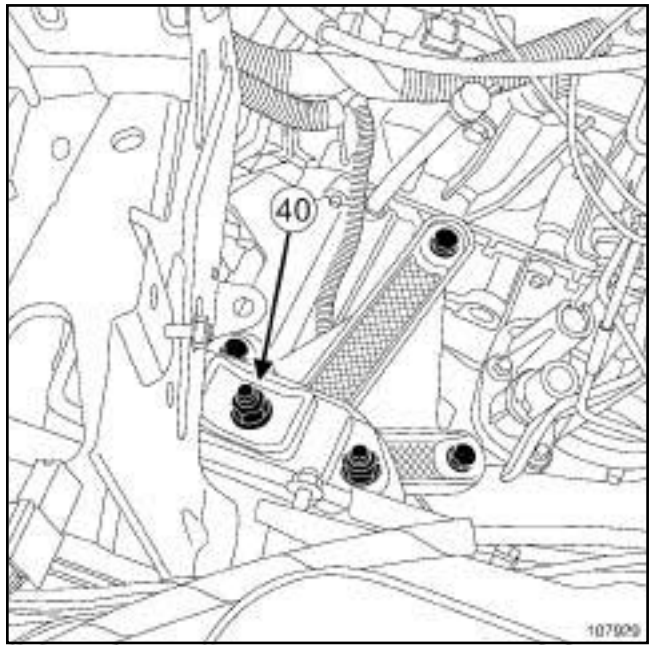
❑

Note:

Ensure that the **(Mot. 1390)** is correctly positioned on the multifunction support at (**39**) .

❑ Position the **(Mot. 1390)** under the engine - gearbox assembly.

❑ Remove the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) .

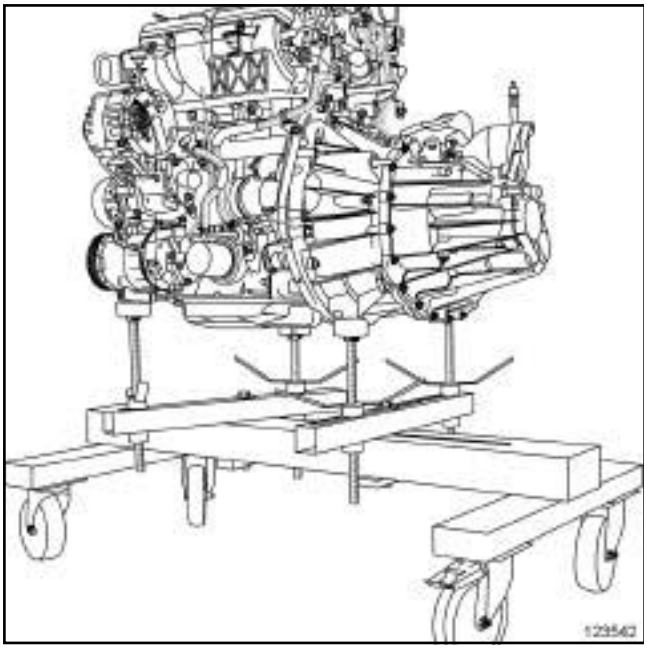


107929

❑ Remove the nut (**40**) on the rubber pad support of the left-hand suspended engine mounting.

❑ Strike the gearbox stud with a copper hammer to separate the engine - gearbox assembly from the body.

K9K, and 796


123542

❑ Lift the vehicle to remove the engine - gearbox assembly.

Note:

Ensure that no component obstructs the movement of the body around the engine - gearbox assembly.

❑ Remove the engine - gearbox assembly.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ For standard engine replacements (see **Engine: Standard replacement**) (Technical Note 6006A, 10A, Engine and peripherals).

❑ **parts always to be replaced: ring between exhaust manifold and catalytic converter**

II - REFITTING OPERATION

❑ Fit the engine - gearbox assembly.

❑ Refit the nut on the rubber pad support of the left-hand suspended engine mounting.

❑ Torque tighten the **nut on the rubber pad support of the left-hand suspended engine mounting (62 N.m)**.

❑ Refit the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) .

❑ Remove the **(Mot. 1390)** from the engine - gearbox assembly.

III - FINAL OPERATION

❑ Proceed in the reverse order to removal.

❑ Torque tighten:

- the **exhaust flange bolts (21 N.m)**,
- the **front axle subframe tie-rod upper bolts (21 N.m)**,
- the **anti-roll bar tie rod upper bolts (37 N.m)**,
- the **earth strap bolt on the gearbox (21 N.m)**,
- the **power-assisted steering low pressure pipe bolt on the front axle subframe (21 N.m)**,
- the **power-assisted steering pipe bolts on the gearbox support (21 N.m)**,
- the **power-assisted steering pipe bolts on the gearbox (21 N.m)**,
- the **power-assisted steering pipe bolt on the cylinder block (21 N.m)**.

❑ Perform the following operations:

- top up the engine oil (see **10A**, **Engine and cylinder block assembly**, **Engine oil: Draining - Refilling**, page **10A-32**) ,
- fill up the gearbox oil (see **Manual gearbox oils: Draining - Filling**) (21A, Manual gearbox),
- fill and bleed the cooling circuit (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) ,
- bleed the clutch circuit (see **Clutch circuit: Bleed**) (37A, Mechanical component controls).

AIR CONDITIONING

❑ Fill the refrigerant circuit using the tool **refrigerant charging station** (see **Refrigerant circuit: Draining - Filling**) (62A, Air conditioning).

❑ Fill up the power-assisted steering circuit.

❑ First, bleed the power-assisted steering circuit by turning the steering wheel fully from left to right with the engine off.

❑ Bleed the power-assisted steering circuit by turning the steering wheel fully from lock to lock with the engine running.

❑ Top up the oil in the power-assisted steering oil reservoir.

K9K, and 796

❑ Check that there are no leaks.

K4M

Tightening torques ▽	
flywheel bolts	25 N.m + 50° ± 6°

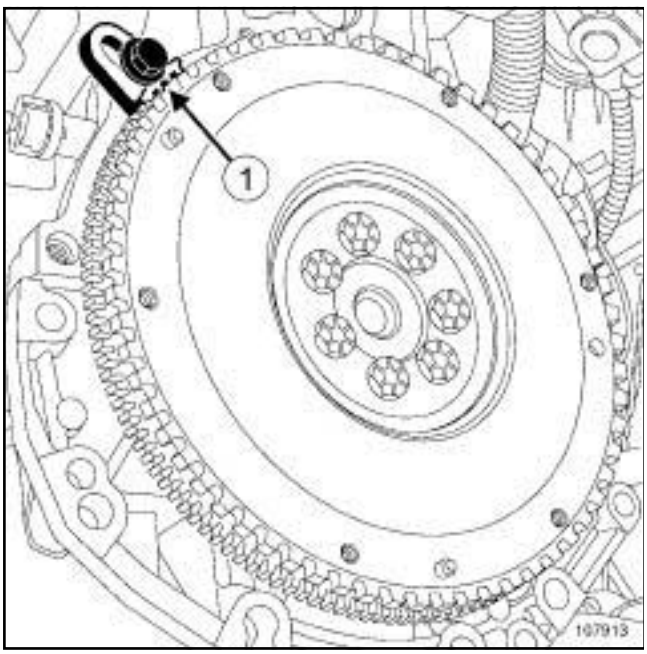
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the gearbox (see **Manual gearbox: Removal - Refitting**) ,
- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) .

II - REMOVAL OPERATION



107913

❑ Lock the engine using the (**1**) .

❑ Remove:

- the flywheel bolts,
- the flywheel,
- the.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check the condition of the flywheel.

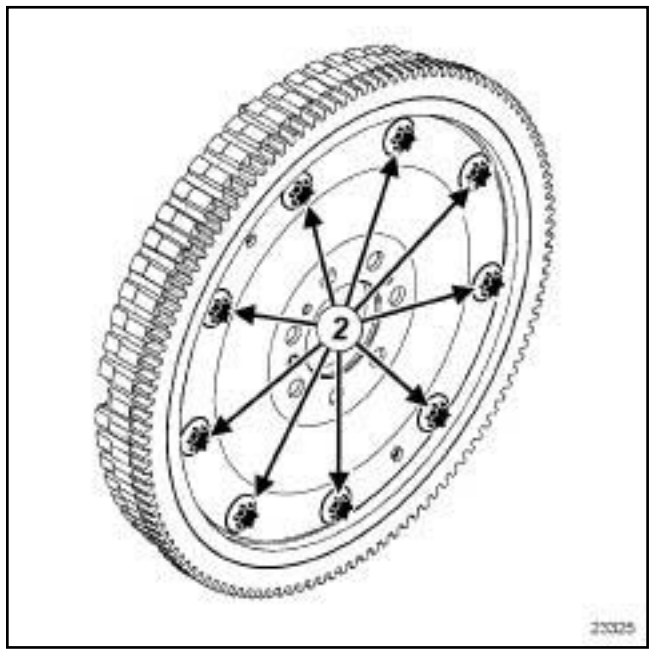
❑ On the crankshaft, clean the flywheel bolt threading.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the flywheel bearing face if reusing,
- the crankshaft bearing face.

❑ **parts always to be replaced: Flywheel bolts**.

❑ Coat the new flywheel bolts using **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).



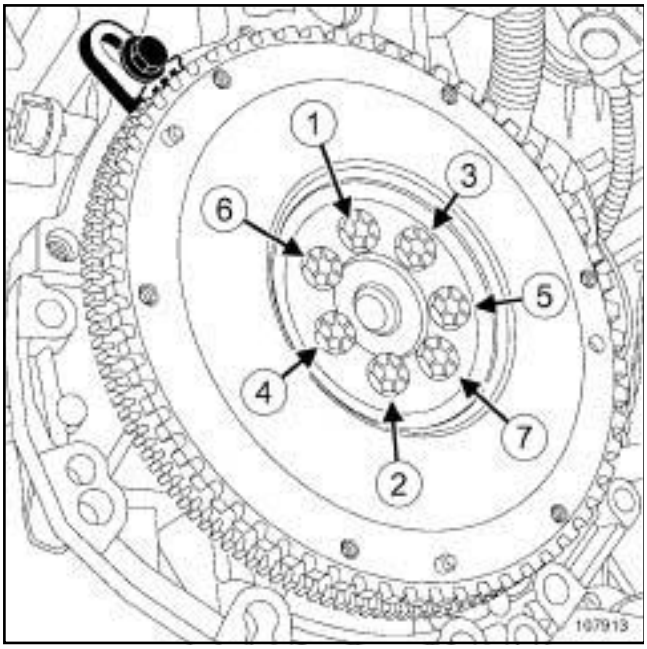
23325

❑

WARNING
Do not remove the bolts (**2**) from the flywheel drive plate.

II - REFITTING OPERATION

❑ Refit the flywheel.



107913

❏ Screw in the new flywheel bolts without tightening them.

❏ Lock the engine using the.

❏ Torque tighten in order the **flywheel bolts (25 N.m + 50° ± 6°)**.

❏ Remove the tool.

III - FINAL OPERATION

❏ Refit:

- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) ,
- the gearbox (see **Manual gearbox: Removal - Refitting**) .

K9K

Tightening torques ▽	
flywheel bolts	**55 N.m**

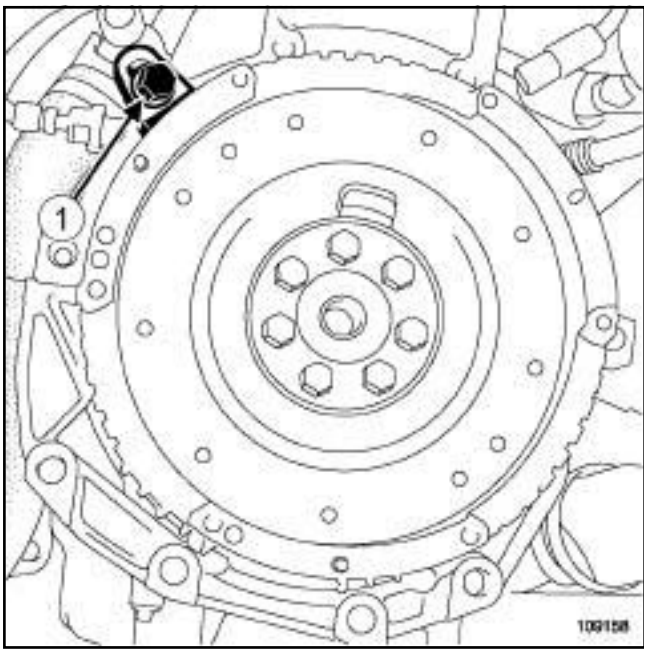
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the manual gearbox (see **Manual gearbox: Removal - Refitting**) ,
- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



109158

❑ Lock the flywheel with the(**1**).

❑ Remove the flywheel bolts.

❑ Remove:

- the flywheel,
- the.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check the condition of the flywheel.

❑ **parts always to be replaced: Flywheel bolts**.

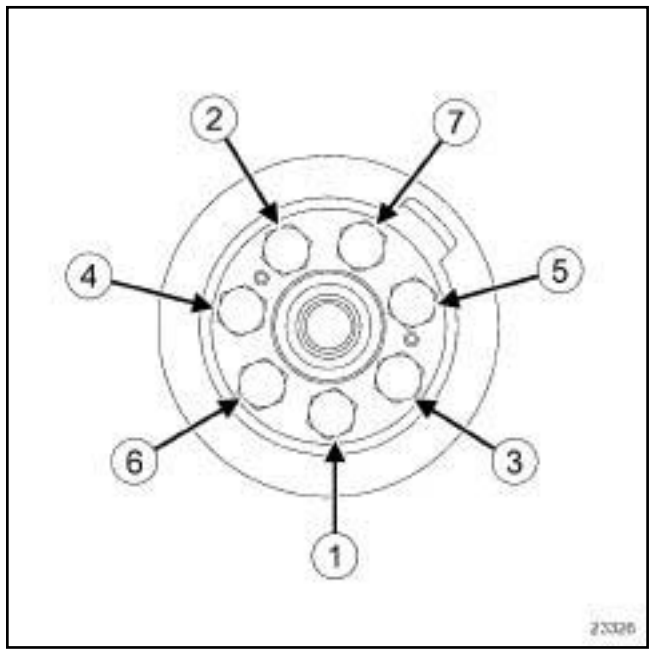
❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the crankshaft bearing face on the flywheel if reused,
- the flywheel pressure face on the crankshaft,
- the flywheel threading.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the flywheel.

❑ Coat the new flywheel bolts with **FRENETANCH** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).



23326

❑ Lock the flywheel using tool.

❑ Tighten to torque and in order the **flywheel bolts (55 N.m)**.

III - FINAL OPERATION

❑ Refit:

- the clutch pressure plate (see **Pressure plate - Disc: Removal - Refitting**) ,
- the manual gearbox (see **Manual gearbox: Removal - Refitting**) .

K4M

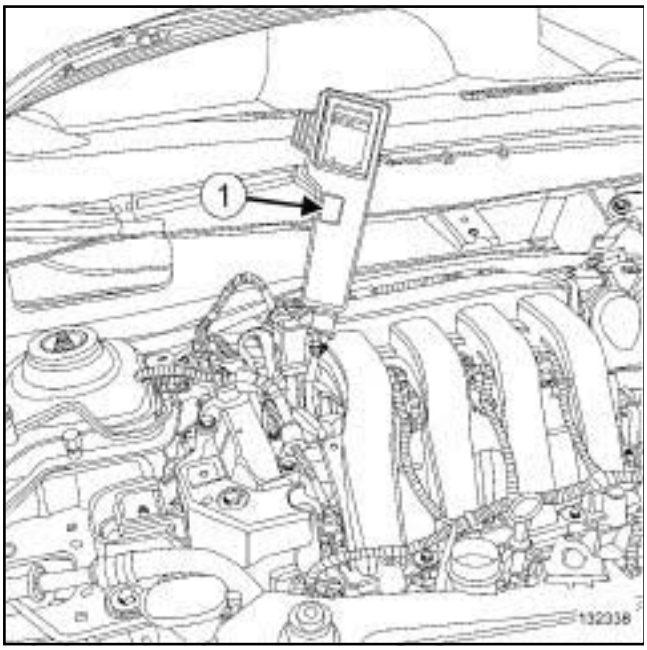
Equipment required
petrol compression gauge
Diagnostic tool

CHECK

I - PREPARATION OPERATION FOR CHECK

❏ Remove:

- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the spark plugs (see **Plugs: Removal - Refitting**) .



132338

❏ Connect a **petrol compression gauge** (**1**) .

❏ Put the vehicle under starting conditions:

- gear lever in neutral position for manual gearbox,
- gear lever in position P (park) for an automatic gearbox.

❏ Disconnect the injector connectors.

II - TEST OPERATION

❏ Activate the starter until the needle of the petrol compression gauge stabilises.

❏ Measure the compression of the engine, cylinder by cylinder.

❏ Fully depress the accelerator pedal in order to open the throttle valve during the compression measurements.

> Note:
>
> It is necessary to wait for at least **10 seconds** before starting the engine each time (the starter will not run due to its thermal protection).

III - FINAL OPERATION

❏ Disconnect the **petrol compression gauge**.

❏ Refit:

- the spark plugs (see **Plugs: Removal - Refitting**) ,
- the coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

❏ Connect the injector connectors.

❏ Using the **Diagnostic tool**, check that there are no faults stored in the computer.

❏ Start the vehicle.

K9K, and STANDARD HEATING RECIRCULATION

Equipment required
offset spanner

Tightening torques ▽	
new accessories belt tensioning roller bolt	**40 N.m**

WARNING

Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

WARNING

In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

REMOVAL

I - REMOVAL PREPARATION OPERATION

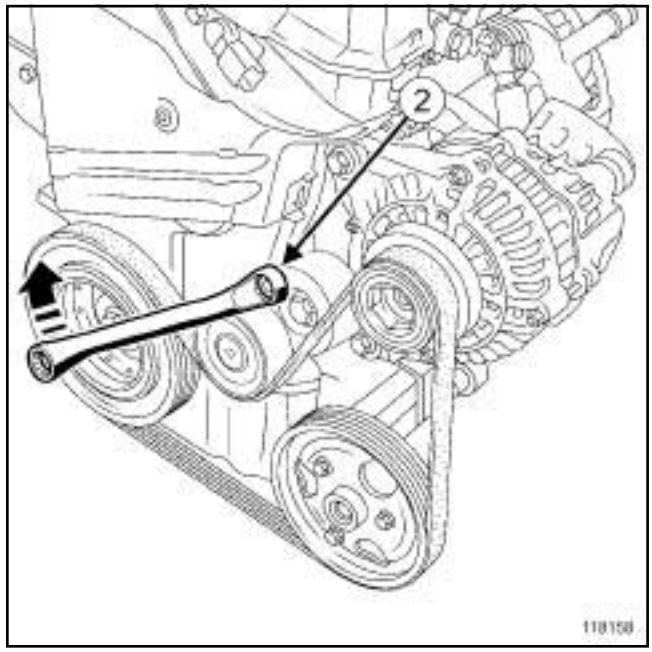
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front wheel arch side liner,
- the front right-hand wheel arch liner partially (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the plastic shield underneath the diesel filter.

II - OPERATION FOR REMOVAL OF PART CONCERNED

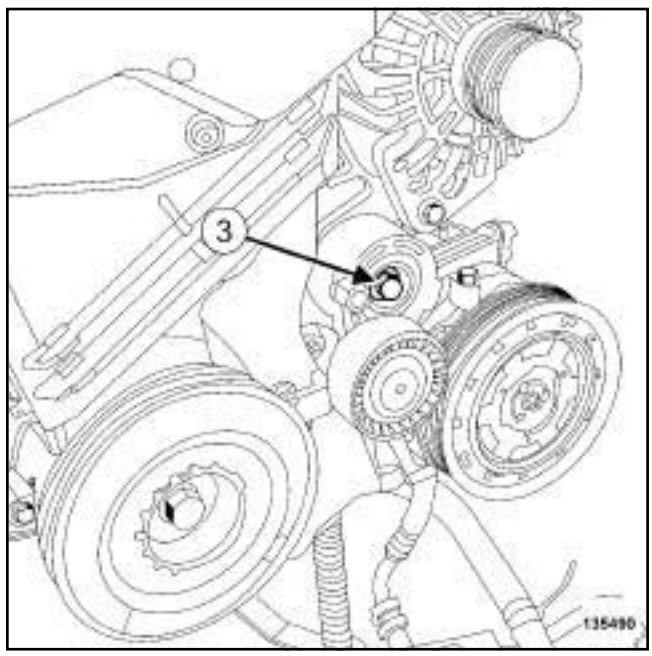
Auto tensioner



118158

❏ Turn the accessories belt tensioning roller clockwise at (**2**) using a **16 mm offset spanner**.

❏ Remove the accessories belt.



135490

❏ Remove:

- the accessories belt tensioning roller bolt (**3**) ,
- the accessories belt tension wheel.

K9K, and STANDARD HEATING RECIRCULATION

REFITTING

I - REFITTING PREPARATION OPERATION

❑

WARNING
Only use brushes with plastic or non-corrosive metal (brass) bristles.

❑ Use a brush to remove any deposits from the crankshaft accessories pulley V-grooves.

❑ **parts always to be replaced: Accessories belt**

❑ **parts always to be replaced: Accessories belt tensioning roller**

❑ **parts always to be replaced: Accessories tensioning roller bolt**

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit a new accessories belt tensioning roller.

Auto tensioner

❑ Torque tighten the **new accessories belt tensioning roller bolt (40 N.m)**.

❑ Refit a new accessories belt.

❑ Rotate the crankshaft clockwise through two revolutions (timing end).

III - FINAL OPERATION

❑ Refit:

- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front wheel arch side liner,
- the plastic shield underneath the diesel filter,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K9K, and AIR CONDITIONING

Tightening torques ▽	
tensioning roller bolt	**40 N.m**

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

WARNING
In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

REMOVAL

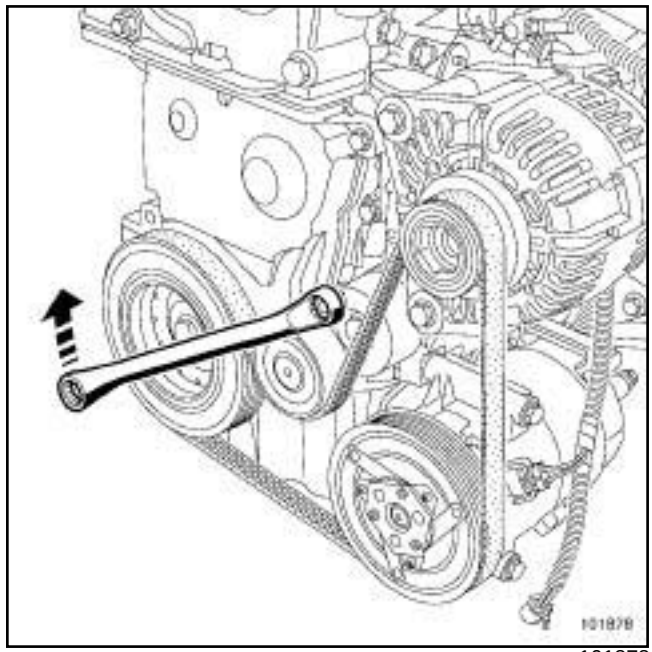
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch side liner,
- the front right-hand wheel arch liner partially (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the plastic shield underneath the diesel filter.

II - REMOVAL OPERATION



101878

❏ Rotate the accessories belt auto tensioner clockwise using a **16 mm** offset wrench.

❏ Remove:

- the accessories belt,
- the accessories belt tension wheel.

REFITTING

I - REPAIR PREPARATION OPERATION

❏ **parts always to be replaced: Accessories belt**.

❏ **parts always to be replaced: Accessories belt tensioning roller**

❏ **parts always to be replaced: Accessories tensioning roller bolt**

WARNING
Only use brushes with plastic or non-corrosive metal (brass) bristles.

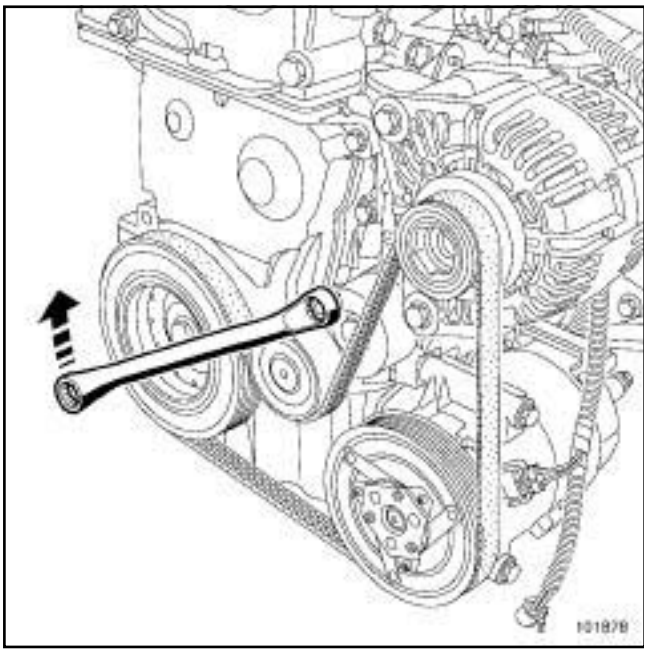
❏ To remove all deposits, use a brush to clean the grooves of:

- the crankshaft pulley,
- the air conditioning compressor pulley,
- the alternator pulley,

❏ Refit a new tensioning roller fitted with a new bolt.

❏ Tighten to torque the **tensioning roller bolt (40 N.m)**.

II - REFITTING OPERATION FOR PART CONCERNED



101878

- ❏ Rotate the tensioning roller clockwise using a **16 mm** offset wrench.
- ❏ Refit a new accessories belt.
- ❏ Turn the crankshaft two revolutions clockwise (timing end) to position the accessories belt correctly.

III - FINAL OPERATION

- ❏ Refit:
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the front right-hand wheel arch side liner,
  - the plastic shield underneath the diesel filter,
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K4M, and POWER ASSISTED STEERING, and AIR CONDITIONING

Tightening torques ▽	
the automatic tensioning roller mounting bolts	**21 N.m**
the fixed roller mounting bolt	**21 N.m**

❑

IMPORTANT
Wear cut-resistant gloves during the operation.

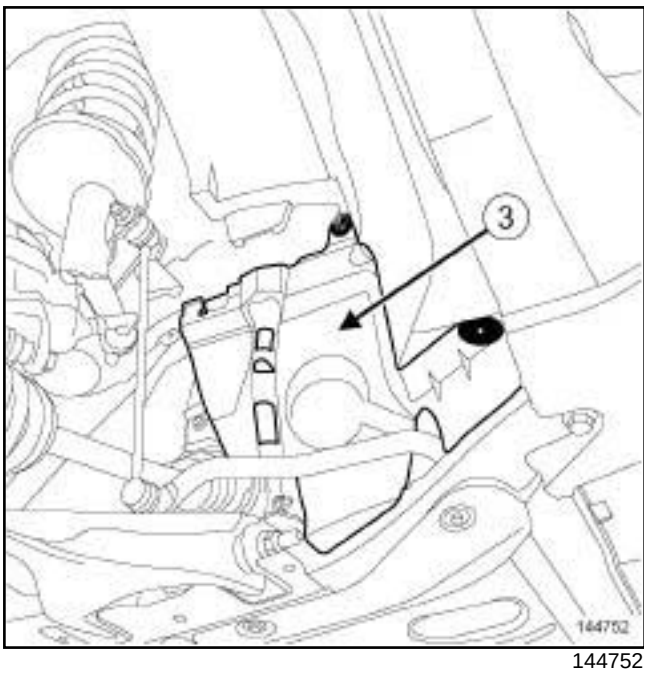
WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

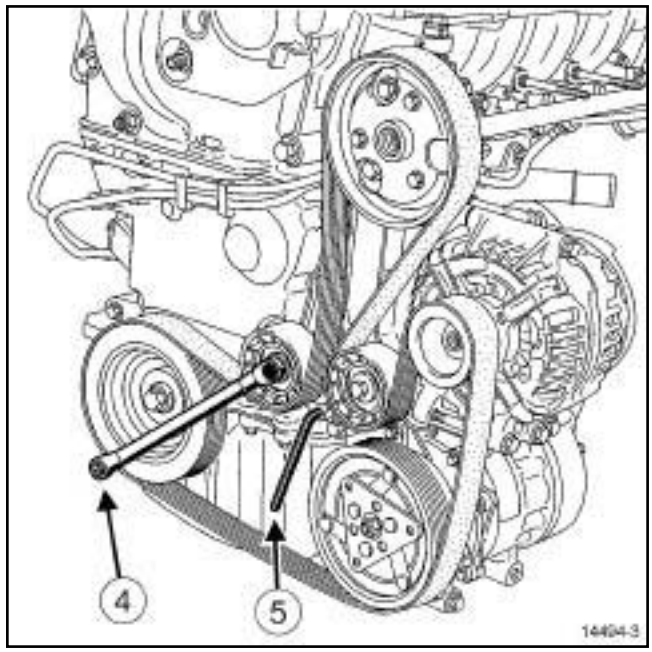
❑ Remove the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).



144752

❑ Remove the front right-hand wheel arch side liner (**3**) .

II - REMOVAL OPERATION



14494-3

❑ Turn the accessories belt auto tensioner anti-clockwise using a spanner (**4**) (**16 mm**), to relax the belt.

❑ Lock the auto tensioner using a **6 mm** Allen key (**5**) .

❑ Remove:

- the accessories belt,
- the auto tensioner bolts,
- the auto tensioner,
- the fixed roller bolt,
- the fixed roller.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Accessories belt**

parts always to be replaced: Accessories belt tensioning roller

parts always to be replaced: Accessories fixed roller

❑ Use a brush to remove any deposits from the crankshaft pulley V-grooves.

II - REFITTING OPERATION

❑ Refit:

- a new fixed roller,
- a new automatic tensioner.

❏ Torque tighten:

- **the automatic tensioning roller mounting bolts (21 N.m)**,
- **the fixed roller mounting bolt (21 N.m)**.

❏ Turn the accessories belt auto tensioner clockwise using a **16 mm** spanner.

❏ Lock the auto tensioner using a **6 mm** Allen key.

❏ Refit a new accessories belt.

❏ Unlock the auto tensioner.

❏ Turn the crankshaft two revolutions clockwise to position the accessories belt correctly.

III - FINAL OPERATION

❏ Proceed in the reverse order to removal.

K4M, and STANDARD HEATING RECIRCULATION

Tightening torques ▽	
auto tensioner bolts	**40 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

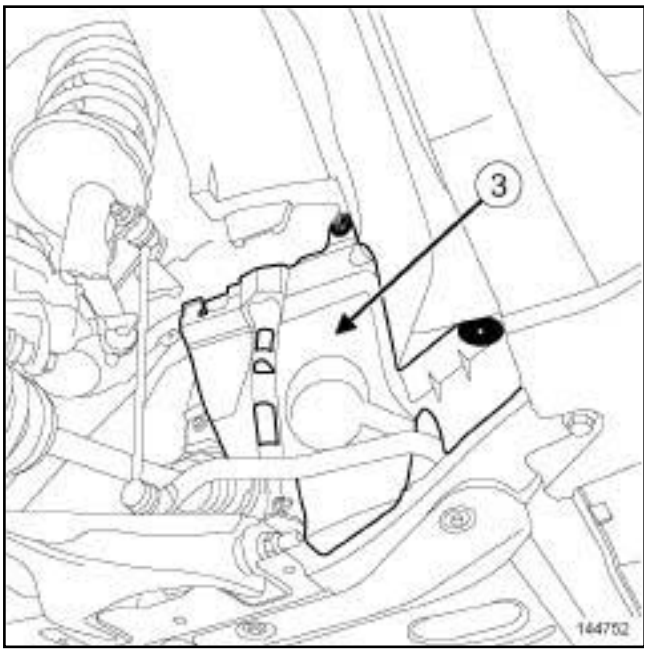
WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

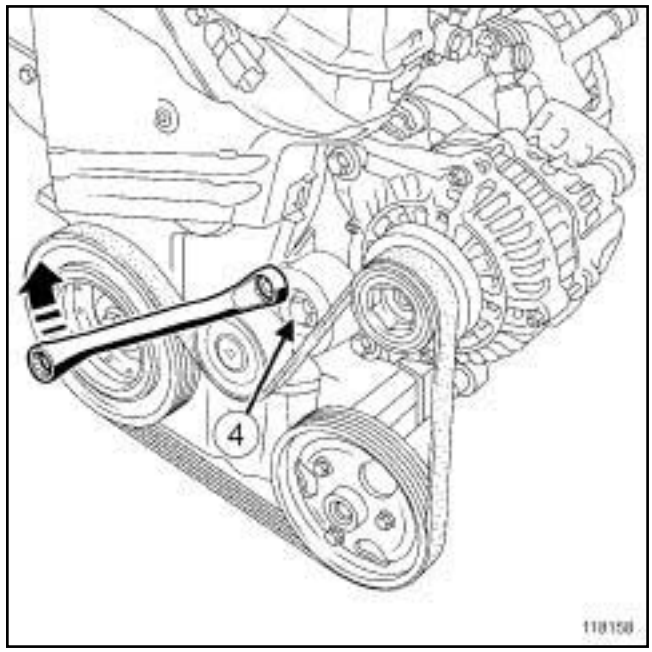
❏ Remove the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).



144752

❏ Remove the front right-hand wheel arch side liner (**3**) .

II - REMOVAL OPERATION



118158

❏ Pivot the accessories belt auto tensioner clockwise.

❏ Remove:

- the accessories belt,
- the tensioning roller bolt (**4**) ,
- the tensioning roller.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Accessories belt**

parts always to be replaced: Accessories belt tensioning roller

❏ Use a brush to remove any deposits from the crankshaft pulley V-grooves.

II - REFITTING OPERATION

❏ Refit a new tensioning roller.

❏ Torque tighten the **auto tensioner bolts (40 N.m)**.

❏ Pivot the accessories belt auto tensioner clockwise.

❏ Refit a new accessories belt.

❏ Turn the crankshaft two revolutions clockwise to position the accessories belt correctly.

III - FINAL OPERATION

❏ Refit the front right-hand wheel arch side liner.

K4M, and STANDARD HEATING RECIRCULATION

❑ Refit the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K9K

Special tooling required	
Mot. 1489	TDC locating pin.

Tightening torques ▽	
accessories pulley bolt	**120 N.m + 95° ±15°**
TDC pin plug	**25 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

REMOVAL

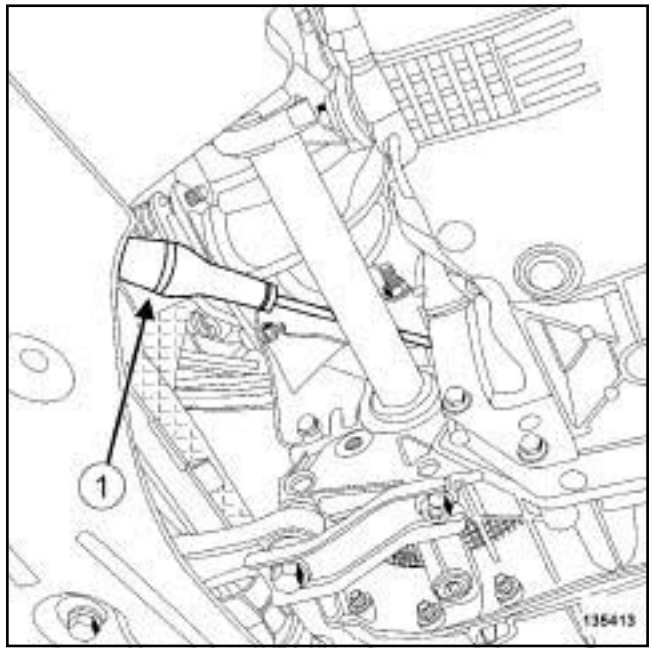
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

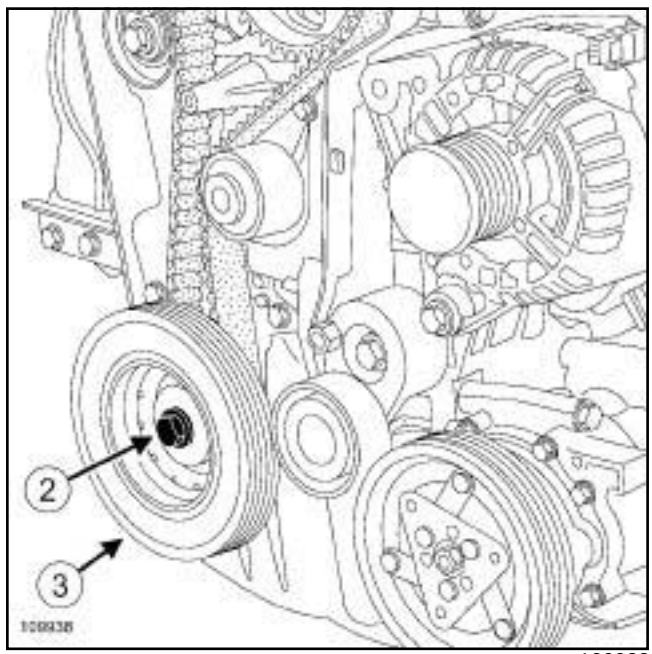
❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch side liner,
- the front right-hand wheel arch partially (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the plastic shield underneath the diesel filter,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

II - REMOVAL OPERATION



135413



109938

❏ Remove:

- the crankshaft accessories pulley bolt (**2**) , locking the flywheel using a large screwdriver (**1**) ,
- the crankshaft accessories pulley (**3**) .

K9K

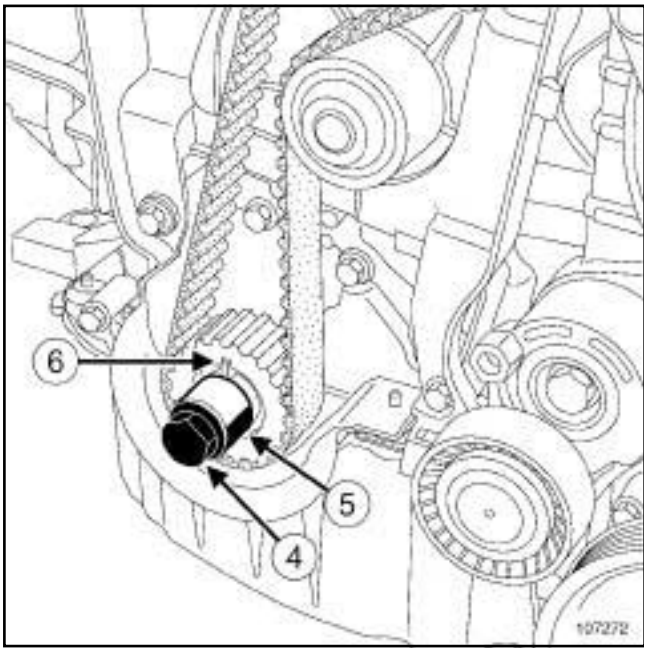
REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft accessories pulley bolts**.

> **WARNING**
> Only use brushes with plastic or non-corrosive metal (brass) bristles.

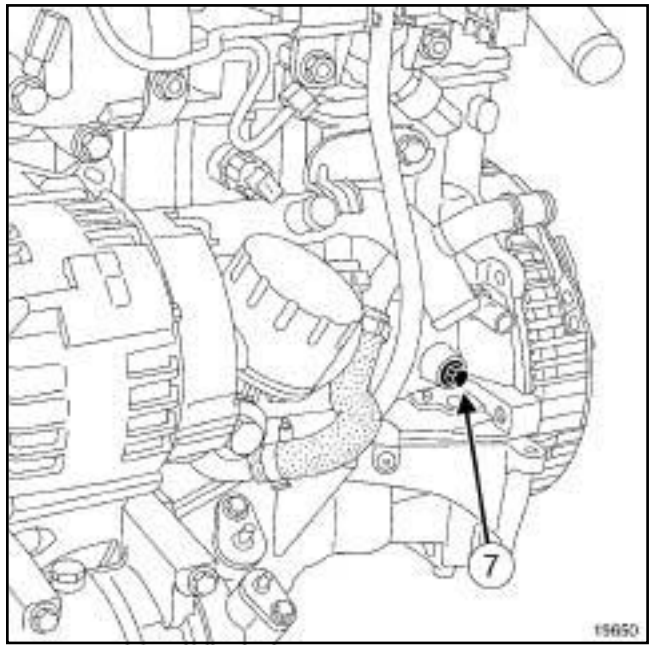
❑ If reusing the crankshaft accessories pulley, clean the crankshaft accessories pulley V-grooves with a brush to eliminate any deposits.



107272

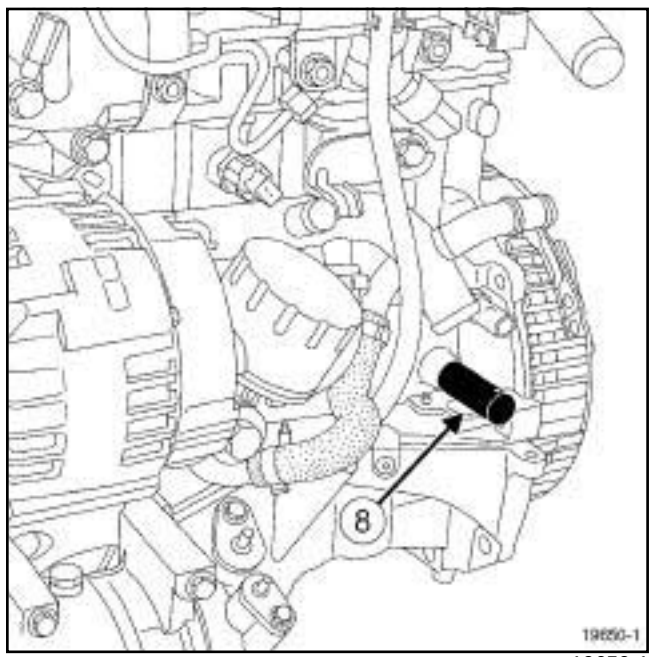
❑ Refit the old crankshaft accessories pulley bolt (**4**) with a spacer (**5**) .

❑ Turn the crankshaft clockwise (timing end) using the old bolt of the crankshaft accessories pulley, until the collet ***(6)*** of the crankshaft timing pinion is almost vertical and facing upwards.



19650

❑ Remove the TDC setting pin plug (**7**) .



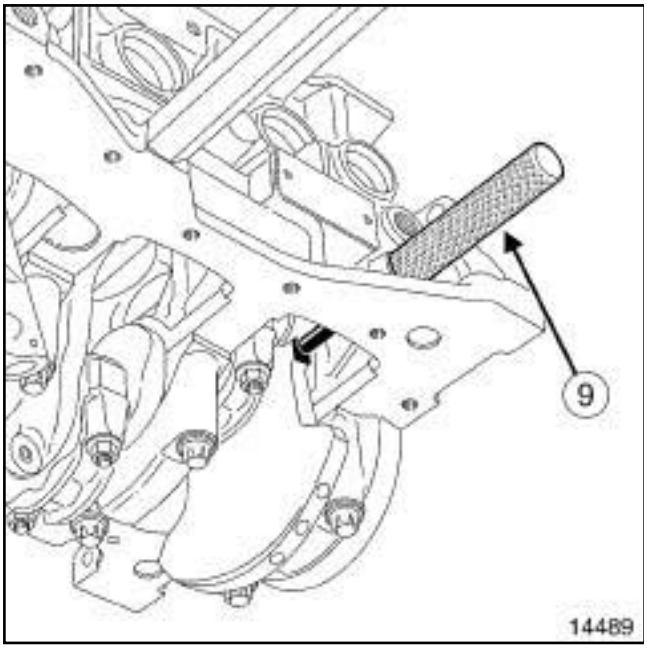
19650-1

❑ Screw the TDC setting pin **(Mot. 1489)** (**8**) into the cylinder block.

❑ Remove the old bolt from the crankshaft accessories pulley fitted with its spacer.

II - REFITTING OPERATION

❑ Refit the accessories crankshaft pulley with a new bolt.



14489

- ❑ Turn the crankshaft clockwise (timing end) smoothly using the bolt of the crankshaft accessories pulley, until the crankshaft presses against the tool **(Mot. 1489)** (**9**) .
- ❑ Torque and angle tighten (with the crankshaft in contact with the TDC setting pin) the **accessories pulley bolt (120 N.m + 95° ±15°)**.
- ❑ Remove the TDC setting rod **(Mot. 1489)**.

III - FINAL OPERATION

- ❑ Apply a drop of **silicone adhesive sealant** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the thread of the TDC setting pin plug.
- ❑ Torque tighten the **TDC pin plug (25 N.m)**.
- ❑ Refit:
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
  - the front right-hand wheel arch side liner,
  - the front right-hand wheel arch (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
  - the plastic shield underneath the diesel filter,
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K4M

Tightening torques ▽	
new crankshaft accessories pulley bolt	**40 N.m + 145° ± 15°**
TDC pin plug	**25 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

REMOVAL

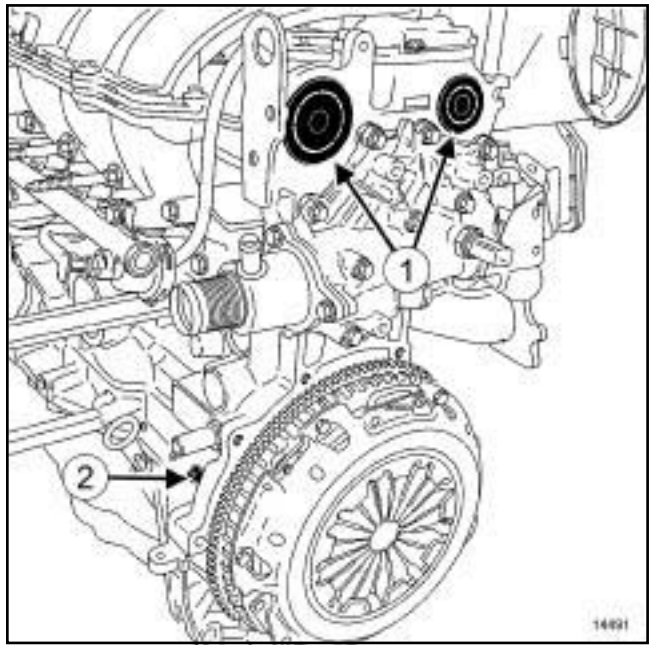
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the air inlet duct,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

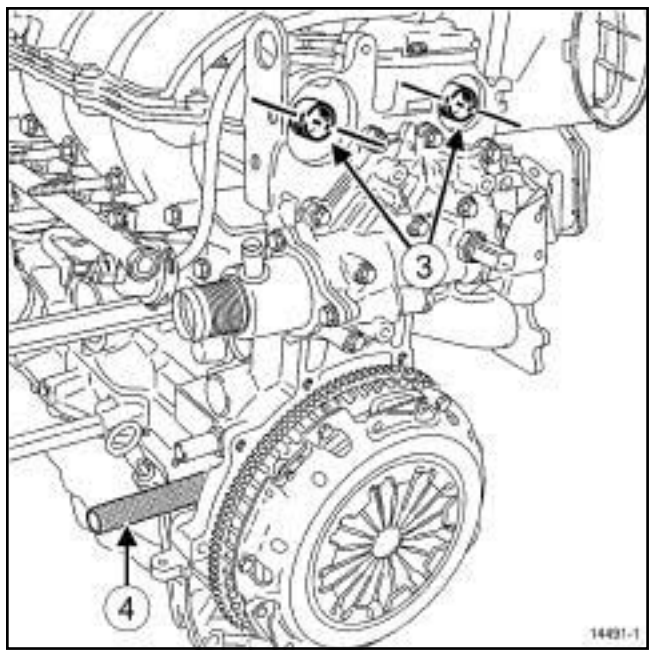


14491

❏ Pierce the centre of the plugs (**1**) at the camshaft ends with a screwdriver.

❏ Remove:

- the plugs from the camshaft ends with a screwdriver,
- the TDC setting pin plug (**2**) .

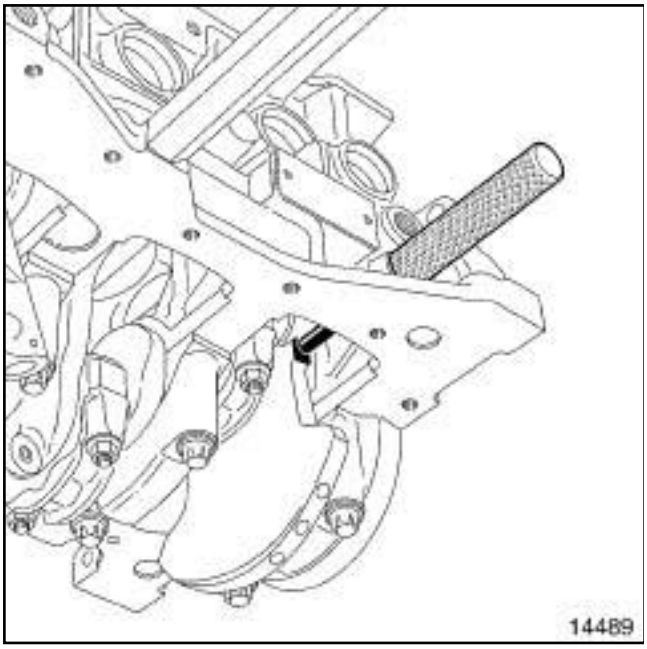


14491-1

❏ Position the camshaft grooves (**3**) almost horizontally and offset towards the bottom turning the crankshaft in the operating direction (clockwise at timing end).

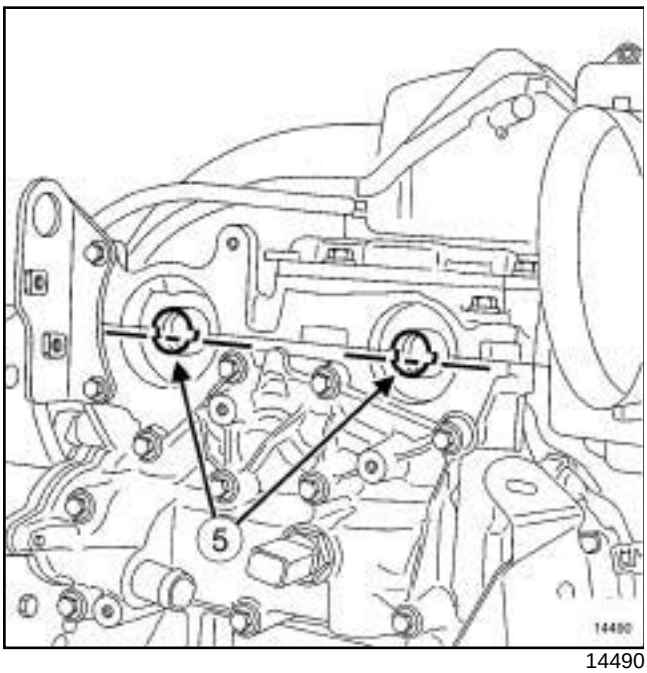
❏ Screw in the TDC setting pin (**4**) .

K4M



14489

❑ Turn the crankshaft in its operating direction (clockwise at timing end), until the crankshaft presses against the TDC setting pin.



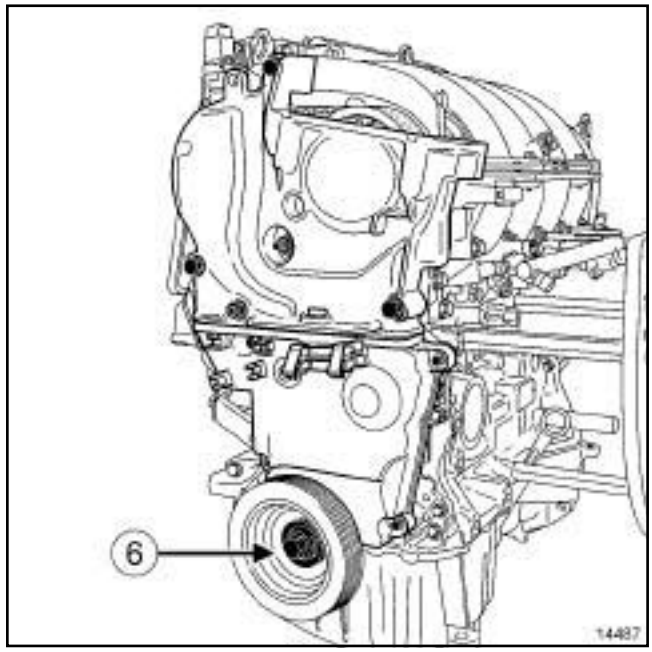
14490

❑ The camshaft grooves (**5**) must be horizontal and offset downwards.

❑ Remove the TDC setting pin.

❑ Lock the flywheel using a screwdriver.

II - REMOVAL OPERATION



14487

❑ Remove the crankshaft accessories pulley bolt (**6**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Crankshaft accessories pulley bolts**

❑

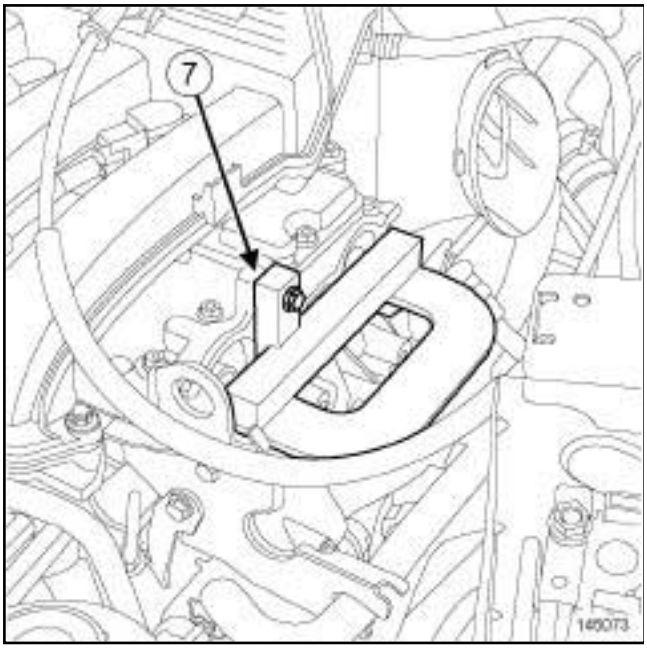
WARNING

Be sure to degrease:

- the end of the crankshaft,
- the bearing face of the crankshaft accessories pulley.

This is to prevent timing slippage.

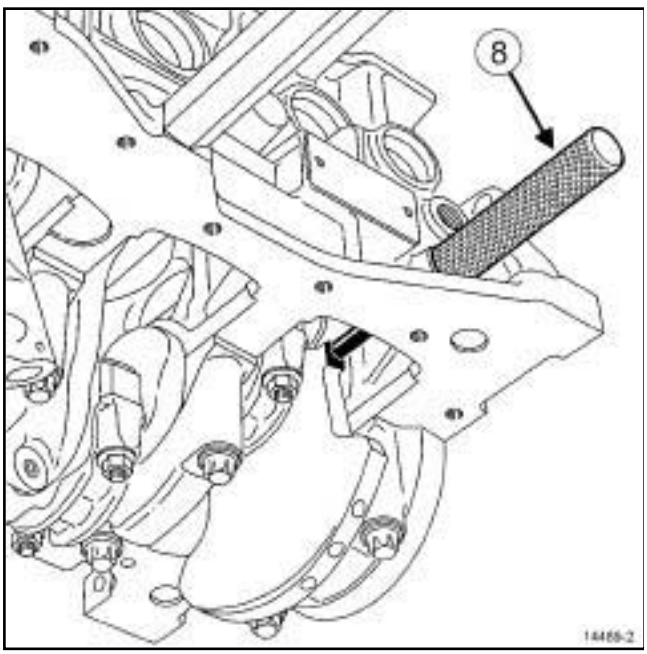
K4M



145073

❏ Position the setting tool.

❏ Secure theto the ends of the camshafts using an M6 bolt (**7**) .

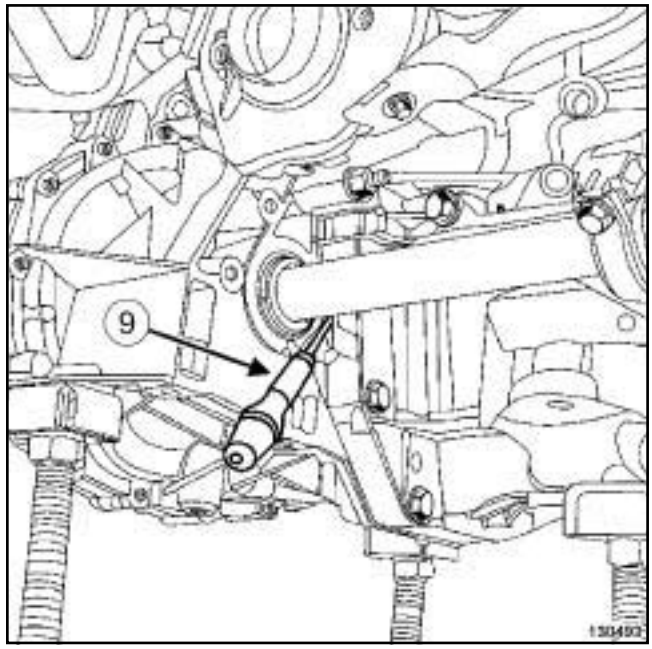


14489-2

❏ Screw in the TDC setting pin (**8**) .

❏ Check that the crankshaft is pressing against the TDC tool.

❏ The crankshaft groove must be upwards.



130493

❏ If the crankshaft is not pressing against the TDC tool, bring the crankshaft back by turning the flywheel using a screwdriver (**9**) .

II - REFITTING OPERATION

❏ Refit the crankshaft accessories pulley.

❏ Torque and angle tighten the **new crankshaft accessories pulley bolt (40 N.m + 145° ± 15°)**.

III - FINAL OPERATION

❏ Remove:

- the TDC tool,
- the setting tool.

❏ Refit:

- a new inlet camshaft plug using the,
- a new exhaust camshaft plug using the.

❏ Place a drop of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) on the threading of the TDC pin plug.

❏ Refit the TDC setting pin plug.

❏ Torque tighten the **TDC pin plug (25 N.m)**.

❏ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),

K4M

- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the air inlet duct.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
timing fixed roller bolt	**50 N.m**
new crankshaft accessories pulley bolt	**40 N.m + 145° ± 15°**
timing tension wheel nut	**27 N.m**
lower timing cover bolts	**12 N.m**
nut of each camshaft sprocket	**30 N.m + 84° ± 4°**
TDC pin plug	**20 N.m**
upper timing cover bolts	**46 N.m**
upper timing cover nuts	**46 N.m**
flywheel end lifting eye bolts	**10 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

REMOVAL

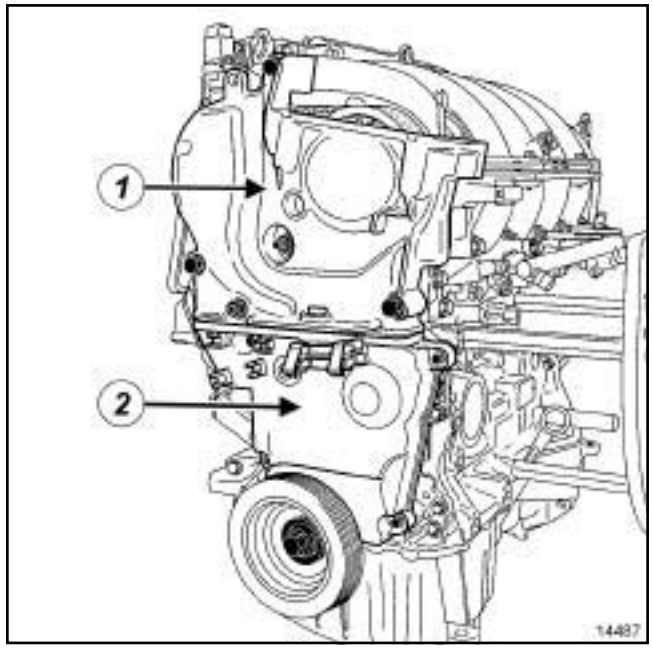
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the air inlet duct,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-10**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) .



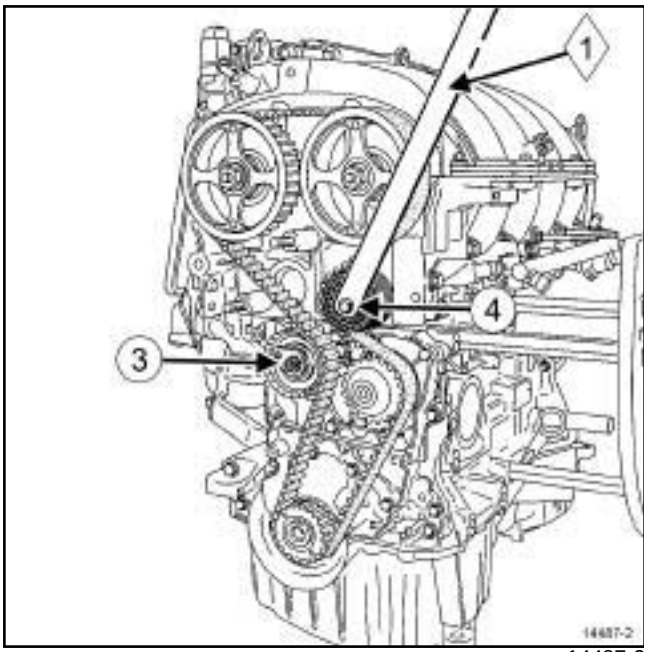
14487

❏ Remove:

- the upper timing cover bolts (**1**) ,
- the upper timing cover,
- the lower timing cover bolts (**2**) ,
- the lower timing cover.

K4M

II - REMOVAL OPERATION



14487-2

❑ Loosen the nut (**3**) of the timing tensioning roller.

Note:

Do not drop the crankshaft timing sprocket when removing the timing belt.

❑ Remove:

- the timing fixed roller bolt (**4**) using the tool (**1**) ,
- the timing fixed roller,
- the timing belt,
- the timing tensioning roller nut,
- the timing tensioning roller,
- the crankshaft timing sprocket.

REFITTING - PROCEDURE 1

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Timing belt**,

❑ **parts always to be replaced: Timing belt tensioning roller**,

❑ **parts always to be replaced: Crankshaft accessories pulley bolts**,

❑ **parts always to be replaced: Inlet camshaft cap**,

❑ **parts always to be replaced: Timing fixed roller**,

❑ **parts always to be replaced: Exhaust camshaft cap**.

II - REFITTING OPERATION FOR PART CONCERNED

❑ The first procedure applies to replacing any timing face component which has a crankshaft timing sprocket without a collet and which does not require one or more of the camshaft sprockets to be loosened.

1 - Adjusting the timing

❑

WARNING

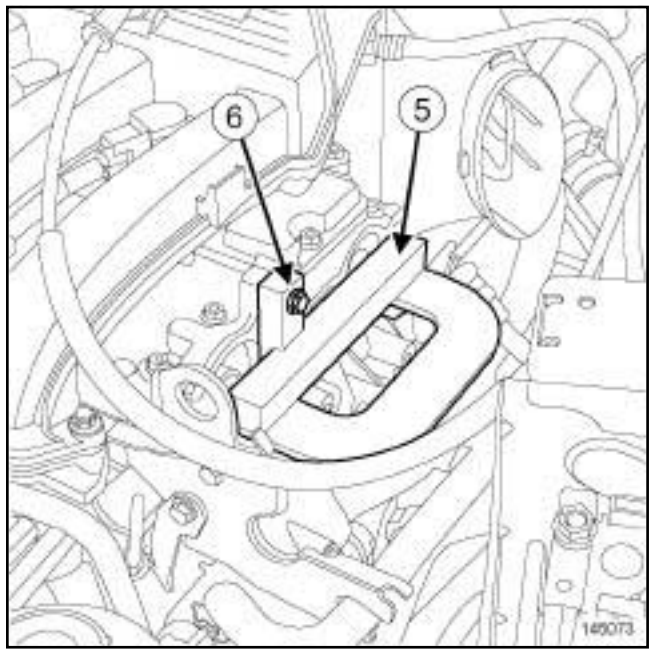
Be sure to degrease:

- the end of the crankshaft (timing end),
- the timing sprocket pressure faces and bore of the crankshaft,
- the crankshaft accessories pulley bearing faces,
- the camshaft ends (timing end),
- the camshaft sprocket bores and bearing faces.

This is to avoid timing slippage.

This slippage leads to engine damage.

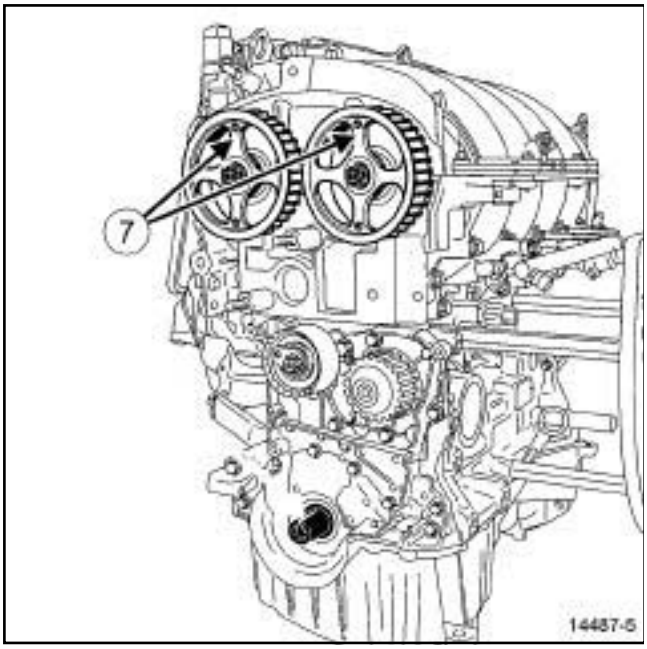
❑ Set the camshaft grooves horizontally and below the centre line by turning the camshafts with theif necessary.



145073

❑ Fit:

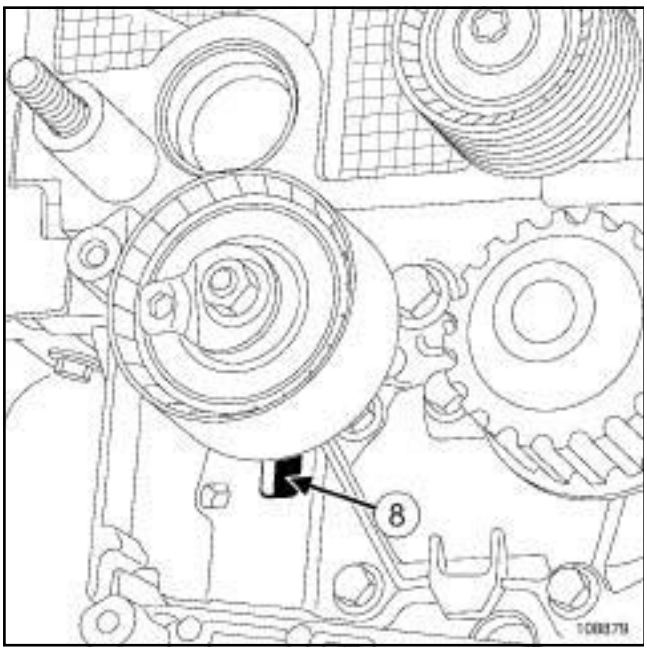
- the (**5**) onto the ends of the camshafts,
- a lifting eye bolt (**6**) to secure the.



14487-5

❑ Position the RENAULT badge (**7**) engraved on the stem of each camshaft sprocket vertically and pointing upwards.

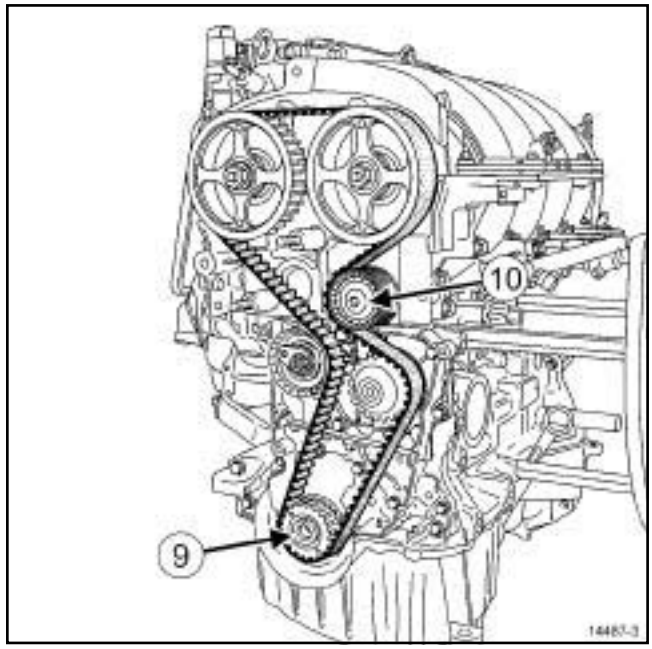
2 - Refitting



108879

❑ Refit a new timing tensioning roller by positioning the lug of the timing tensioning roller in the groove (**8**) .

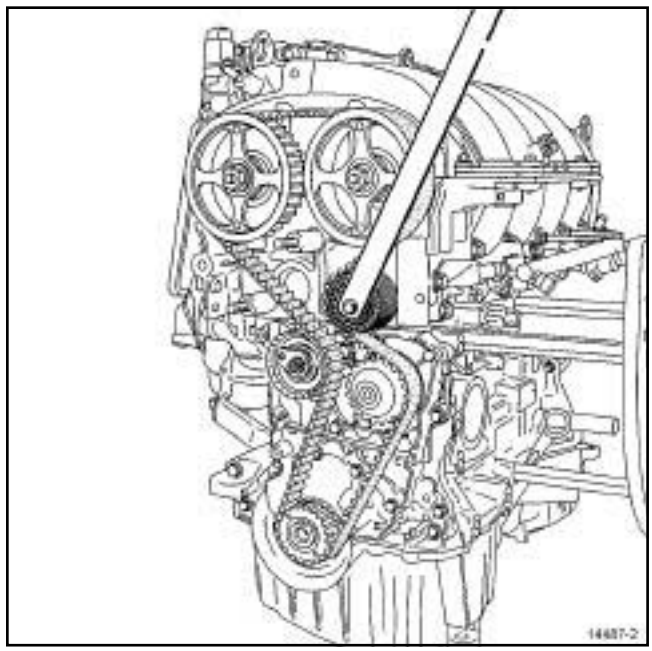
❑ Screw on the timing tensioning roller nut without tightening it.



14487-3

❑ Refit:

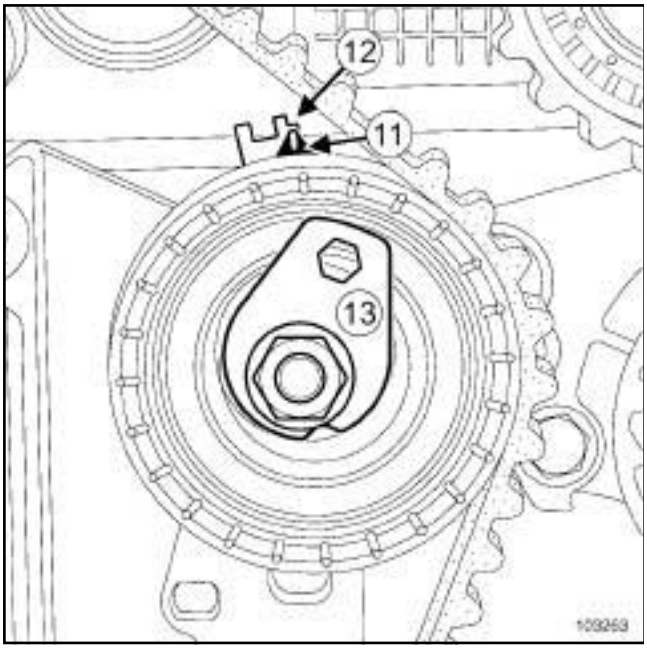
- the crankshaft timing sprocket (**9**) ,
- a new timing belt,
- a new timing fixed roller (**10**) .



14487-2

❑ Torque tighten the **timing fixed roller bolt (50 N.m)** using the tool.

K4M



103263

❑ Position the adjustable index (**11**) opposite the mark (**12**) , by turning the eccentric (**13**) clockwise using a **6 mm** Allen key.

❑ Torque tighten the **timing tensioning roller nut (7 N.m)**.

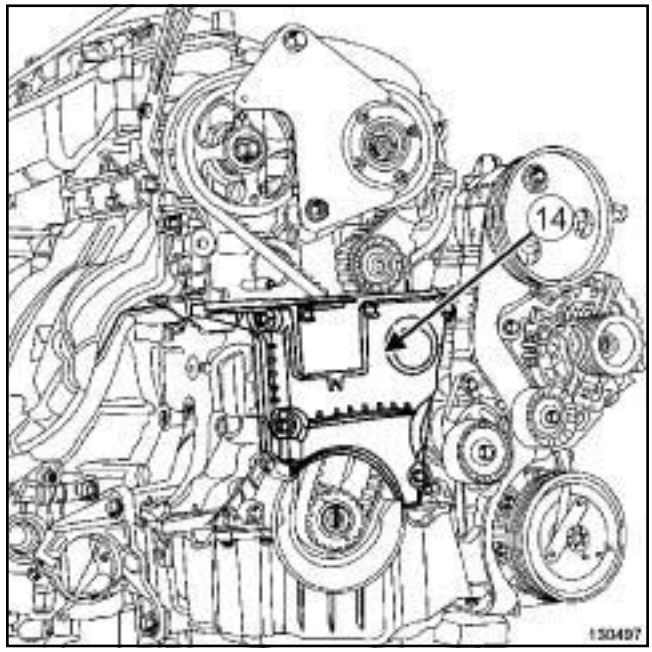
❑ Refit the toolon the cylinder block.

Note:

There are two types of lower timing cover:

- without a timing flap,
- with a timing flap.

a - Lower timing cover with a timing flap



130497

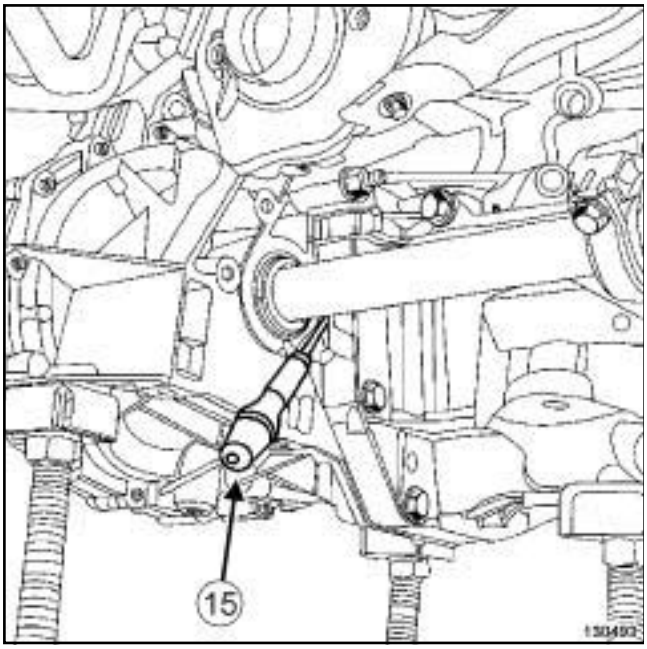
❑ Refit the lower timing cover (**14**) .

❑ Tighten to torque the **lower timing cover bolts (12 N.m)**.

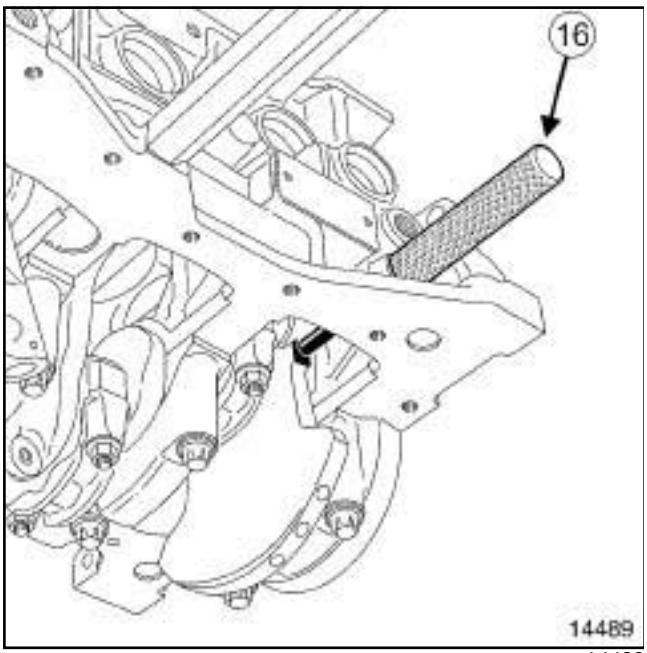
b - continuation of the refitting procedure regardless of the type of lower timing cover

❑ Refit a new crankshaft accessories pulley.

K4M



130493

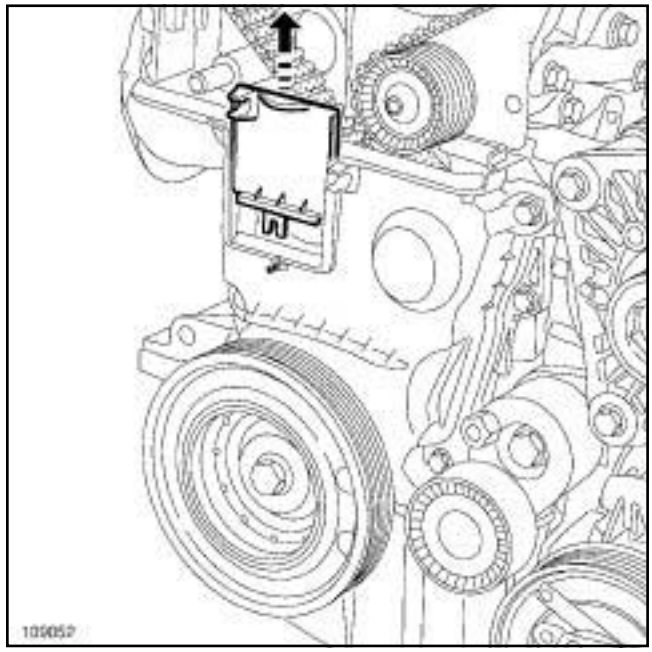


14489

❑ Use a screwdriver (**15**) to check that the flywheel does not turn (clockwise at the timing end), otherwise bring the crankshaft back into contact with the tool (**16**) using the screwdriver; the crankshaft groove should be at the top.

❑ Torque and angle tighten a **new crankshaft accessories pulley bolt (40 N.m + 145° ± 15°)** (crankshaft in contact with the tool).

c - Lower timing cover with a timing flap


109052

❑ Remove the timing flap from the lower timing cover.

d - continuation of the refitting procedure regardless of the type of lower timing cover

❑ Remove:

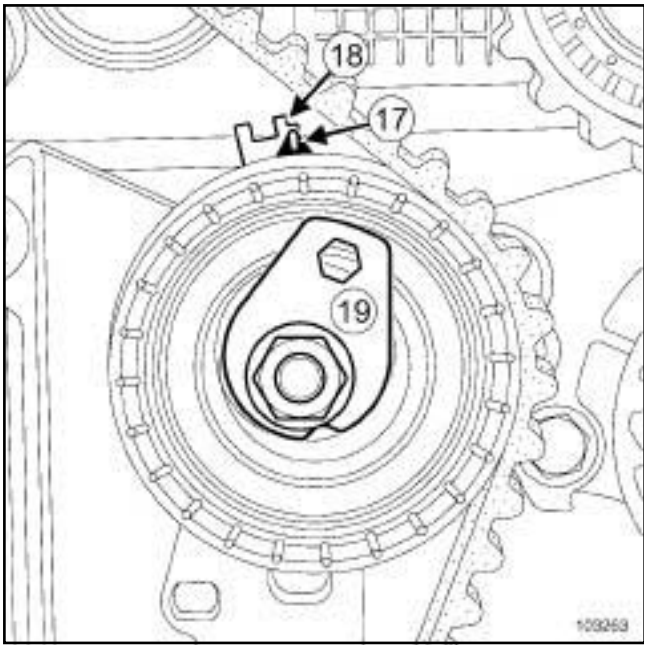
- the bolt of the tool,
- the setting tool,
- thefrom the cylinder block.

3 - Checking the tension

❑ Rotate the crankshaft twice clockwise at the timing end and before aligning the marks made previously by the operator (on the camshaft dephaser), screw the toolinto the cylinder block.

❑ Move the crankshaft slowly and smoothly until it comes into contact with the tool.

❑ Remove the toolfrom the cylinder block.



103263

❏ Check that the adjustable index (**17**) is opposite the notch (**18**) , if this is not the case:

- loosen the timing tensioning roller nut by up to one turn while holding the eccentric with a **6 mm** Allen key,
- gradually move the adjustable index marker (**17**) opposite the mark (**18**) turning the eccentric cam (**19**) clockwise.

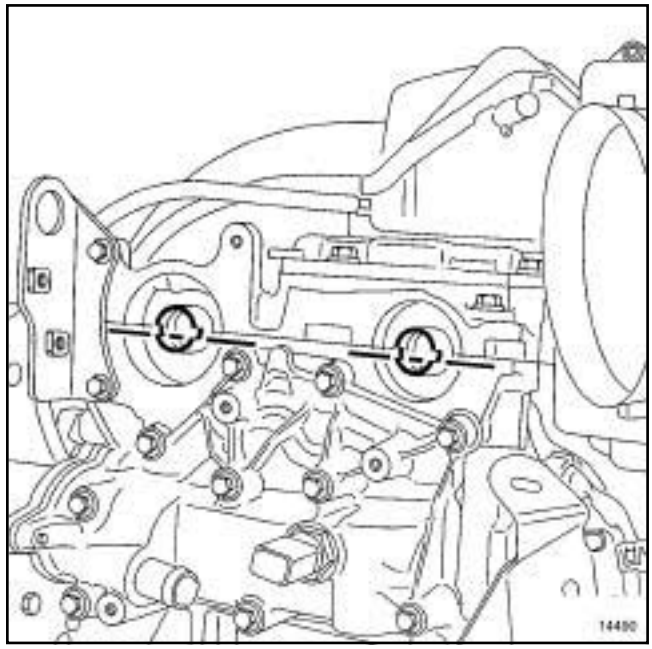
❏ Torque tighten the **timing tension wheel nut (27 N.m)**.

4 - Checking the timing

❏ Ensure that the index and the notch on the timing tensioning roller are in the correct position before checking the timing.

❏ Screw toolinto the cylinder block.

❏ Move the crankshaft slowly and smoothly until it comes into contact with the tool.


14490

❏ Position (without forcing) the camshaft setting tool(the camshaft end grooves must be horizontal and offset towards the bottom).

Note:

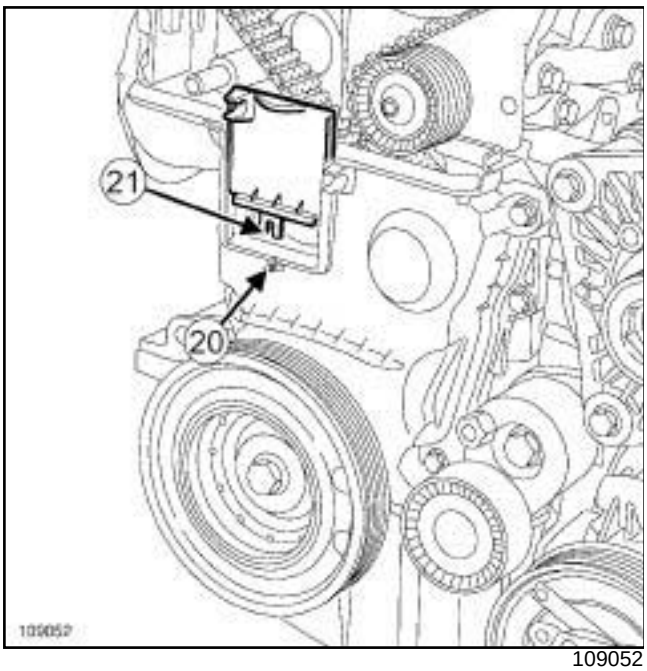
The timing adjustment and tensioning operation must be repeated if the camshaft setting tool does not engage.

❏ Remove:

- the setting tool,
- thefrom the cylinder block.

K4M

a - Lower timing cover with a timing flap



109052

❏ Refit the lower timing cover flap, checking that the locating pin (**20**) fits properly in the notch (**21**) .

b - Lower timing cover without a timing flap

❏ Refit the lower timing cover.

❏ Tighten to torque the **lower timing cover bolts (12 N.m)**.

REFITTING -PROCEDURE 2

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Timing belt**,

❏ **parts always to be replaced: Timing belt tensioning roller**,

❏ **parts always to be replaced: Timing fixed roller**,

❏ **parts always to be replaced: Crankshaft accessories pulley**,

❏ **parts always to be replaced: camshaft timing sprocket nut**,

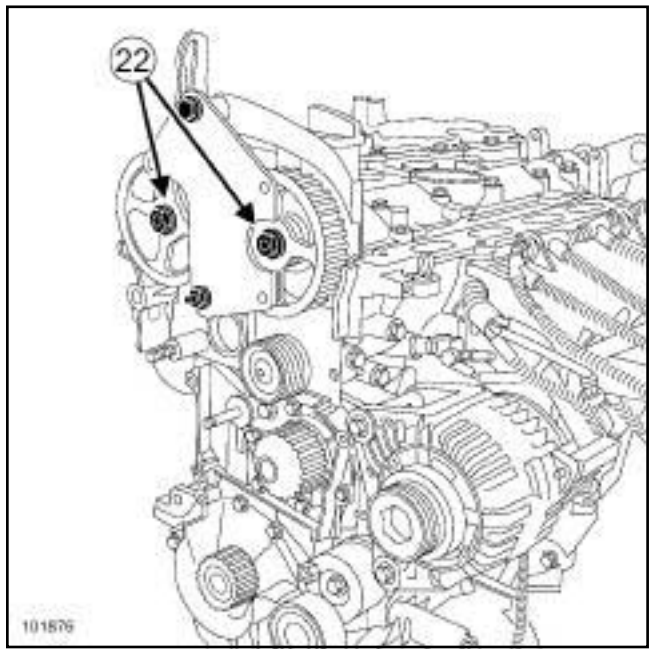
❏ **parts always to be replaced: Crankshaft accessories pulley bolts**,

❏ **parts always to be replaced: Inlet camshaft cap**,

❏ **parts always to be replaced: Exhaust camshaft cap**.

II - REFITTING OPERATION

❏ The second procedure is used when replacing any timing face component which has a crankshaft timing sprocket with or without a collet, that requires one or more of the camshaft sprockets to be loosened.



101876

❏ Fit the toolon the camshaft sprockets using the tool.

❏ Loosen the nuts (**22**) of each camshaft sprocket.

❏ Remove:

- the toolfrom the cylinder block,
- every camshaft sprocket nut,
- the camshaft sprockets.

K4M

1 - Adjusting the timing

❑

Note:

If the stud loosens with the nut (see **11A**, **Top and front of engine**, **Camshaft: Removal - Refitting**, page **11A-49**) (11A, Top and front of engine).

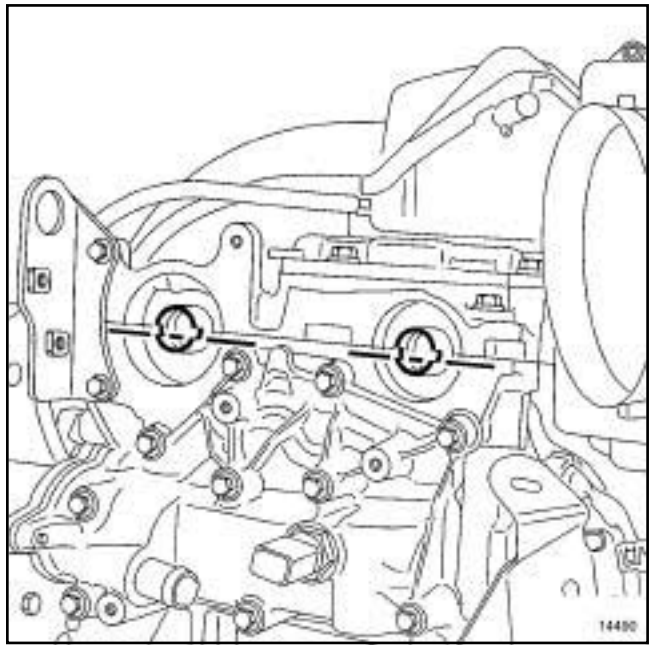
WARNING

Always degrease:

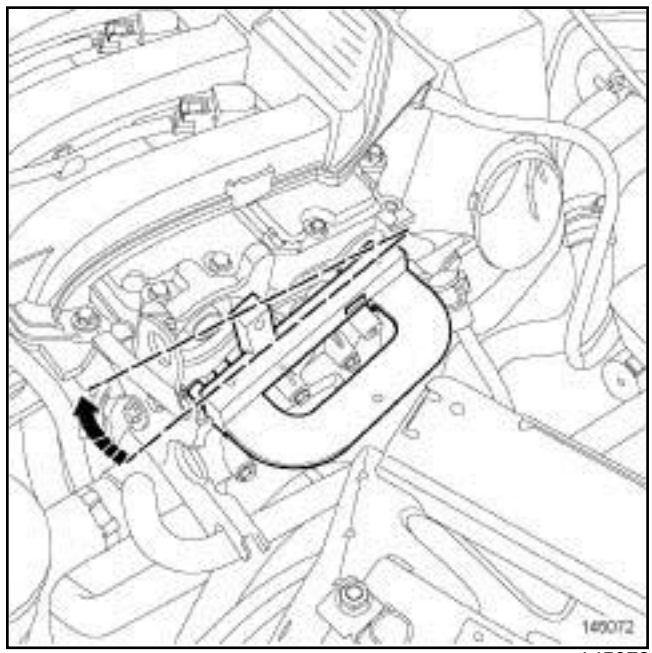
- the end of the crankshaft (timing end),
- the timing sprocket pressure faces and bore of the crankshaft,
- the crankshaft accessories pulley bearing faces,
- the camshaft ends (timing end),
- the camshaft sprocket bores and bearing faces.

This is to avoid timing slippage.

This slippage leads to engine damage.



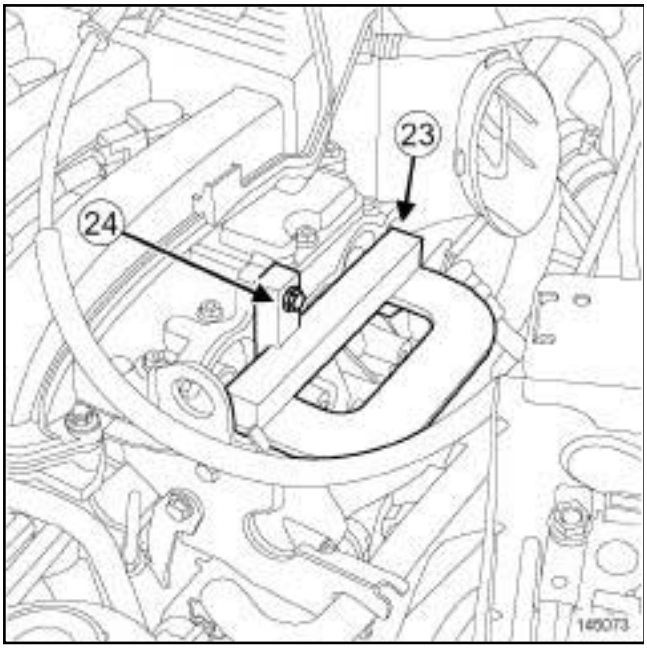
14490



145072

❑ Position the camshaft grooves horizontally and below the centre line, by turning the camshafts with theif necessary.

K4M



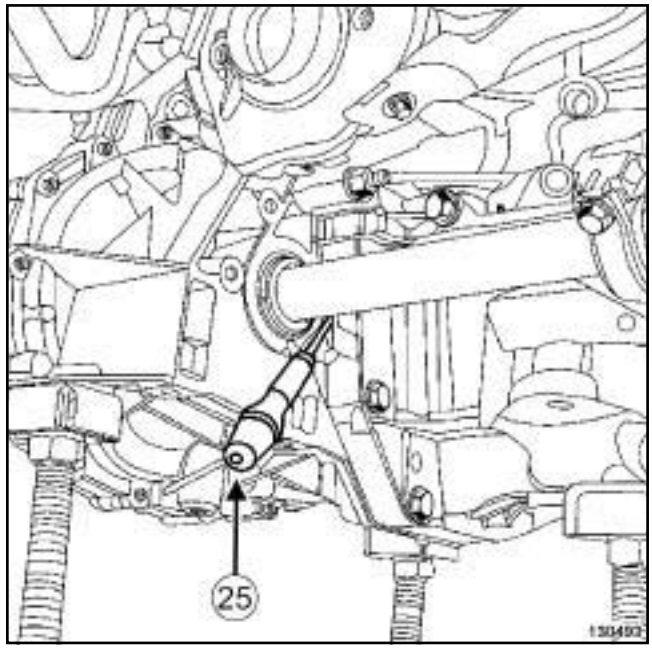
145073

❑ Fit:

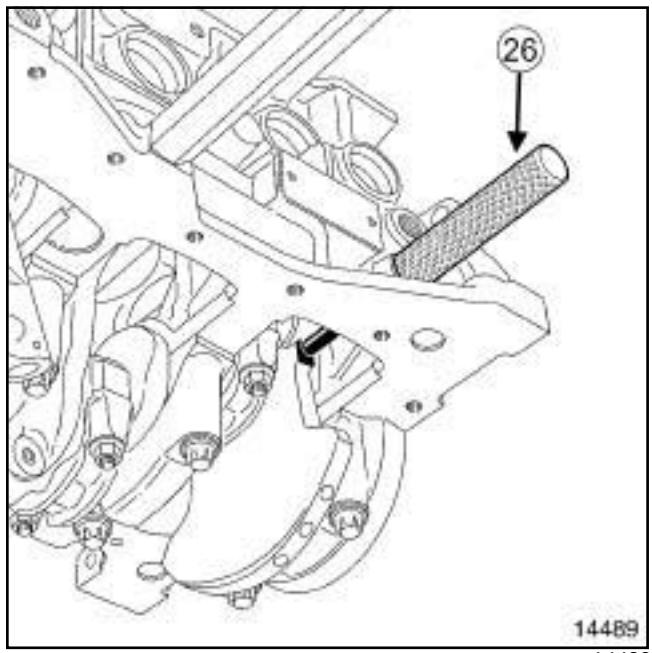
- the (**23**) onto the ends of the camshafts,
- an M6 bolt (**24**) to hold the.

❑ Refit:

- the crankshaft timing sprocket,
- the camshaft sprockets,
- every camshaft sprocket nut.



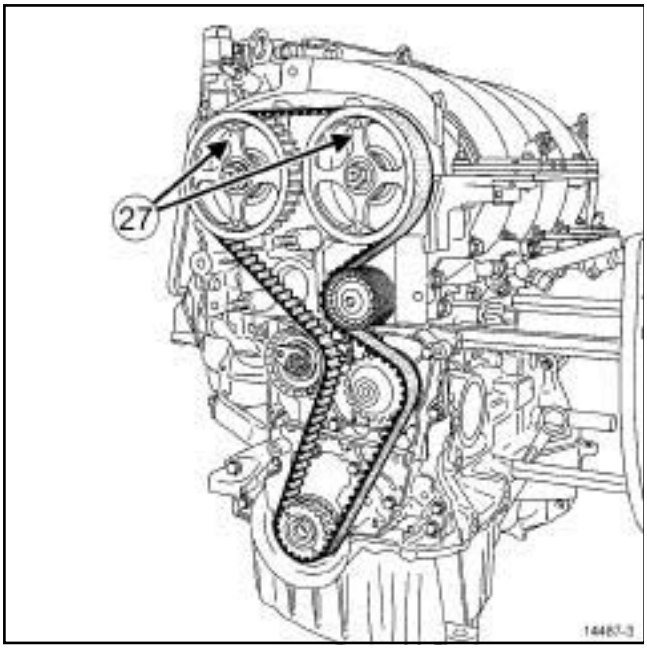
130493



14489

❑ Refit the toolon the cylinder block.

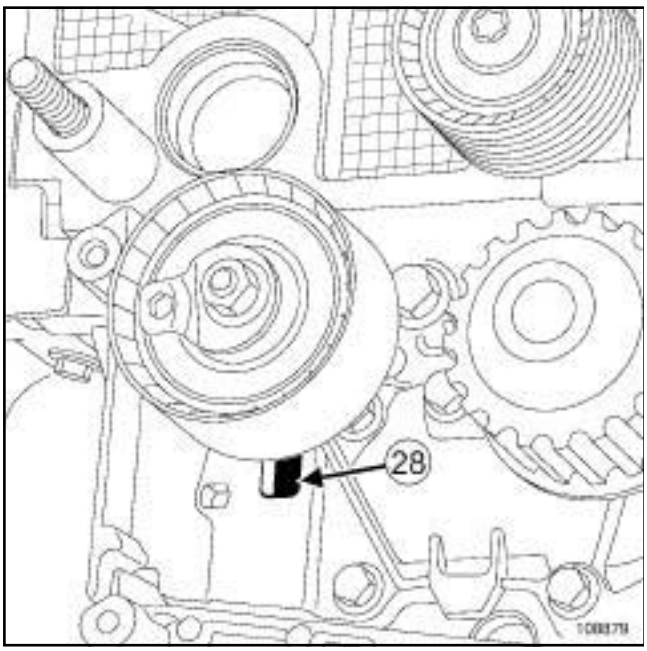
❑ Use a screwdriver (**25**) to check that the flywheel does not turn (clockwise at the timing end), otherwise bring the crankshaft back into contact with the tool (**26**) using the screwdriver; the crankshaft groove should be at the top.



14487-3

❑ Position the RENAULT badge (**27**) etched on the stem of each camshaft sprocket vertically and pointing upwards.

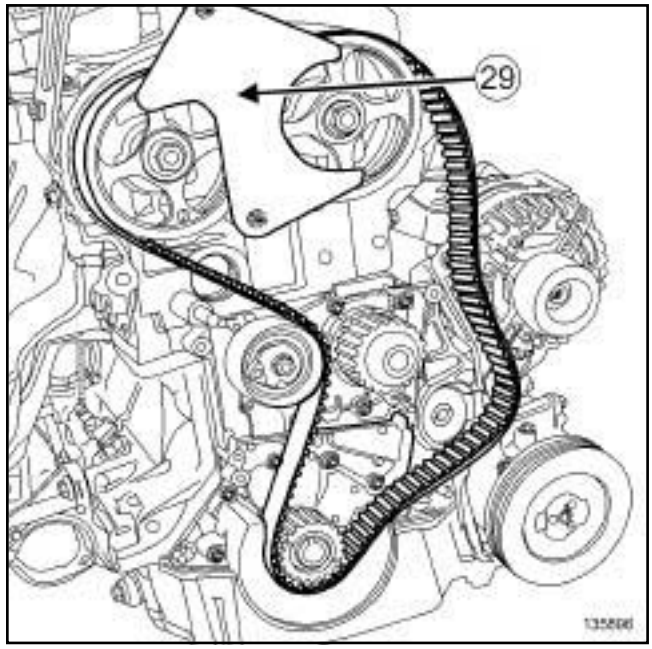
2 - Refitting



108879

❑ Refit a new timing tensioning roller by positioning the lug of the timing tensioning roller in the groove (**28**) .

❑ Screw on the timing tensioning roller nut without tightening it.



135896

❑ Refit a new timing belt starting with the sprocket of each camshaft (without moving the sprocket of each camshaft).

❑ Fit the tool (**29**) on the camshaft sprockets (use the bolt and nut of the upper timing cover to fit the tool).

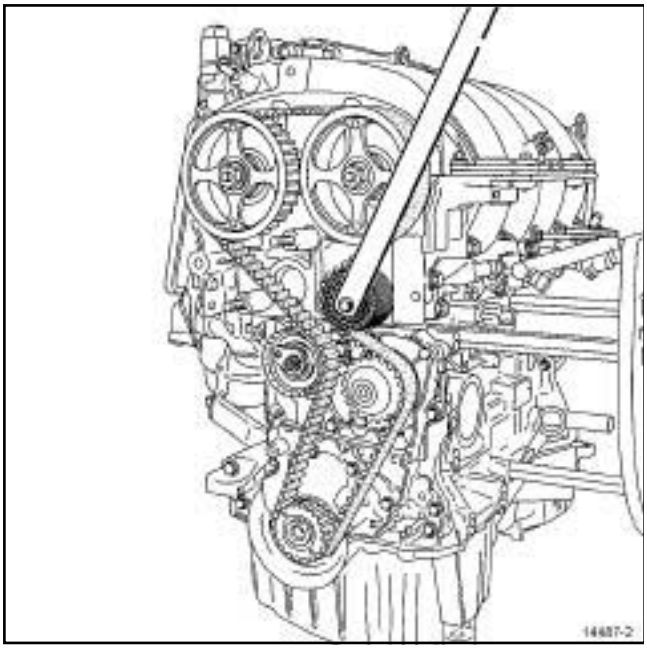
Note:

Take care to properly tighten the timing belt between the two camshaft sprockets.

Note:

If the engine is equipped with a crankshaft timing sprocket with a collet, take care to properly tighten the timing belt between the exhaust camshaft sprocket and the crankshaft timing sprocket.

K4M

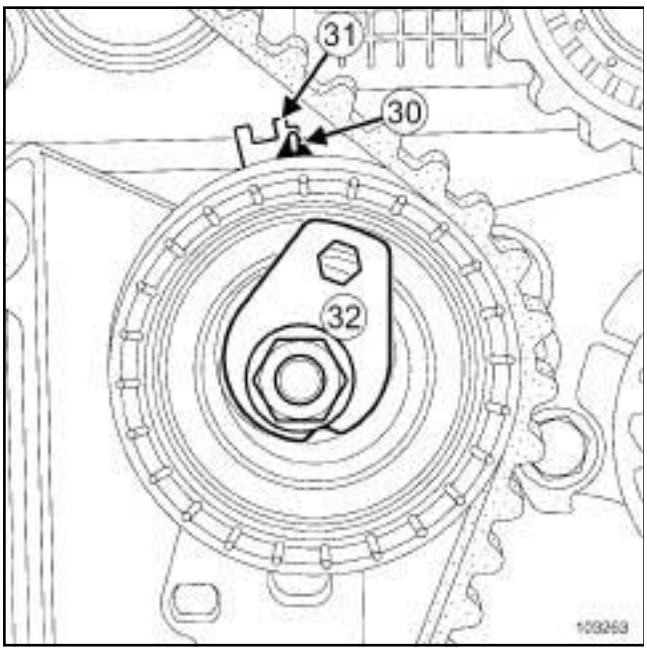


14487-2

❑ Refit a new timing fixed roller.

❑ Torque tighten the **timing fixed roller bolt (50 N.m)** using the tool.

3 - Timing belt tension



103263

❑ Position the adjustable index (**30**) opposite the mark (**31**) , by turning the eccentric (**32**) clockwise using an Allen key.

❑ Torque tighten the **timing tensioning roller nut (7 N.m)**.

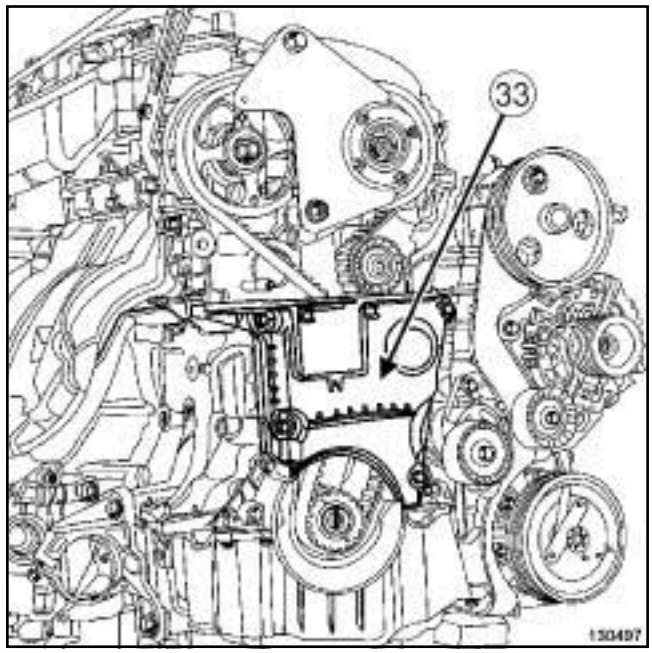
Note:

There are two types of lower timing cover:

- without a timing flap,

- with a timing flap.

a - Lower timing cover with a timing flap



130497

❑ Refit the lower timing cover (**33**) .

❑ Tighten to torque the **lower timing cover bolts (12 N.m)**.

b - continuation of the refitting procedure regardless of the type of lower timing cover

❑ Refit a new crankshaft accessories pulley.

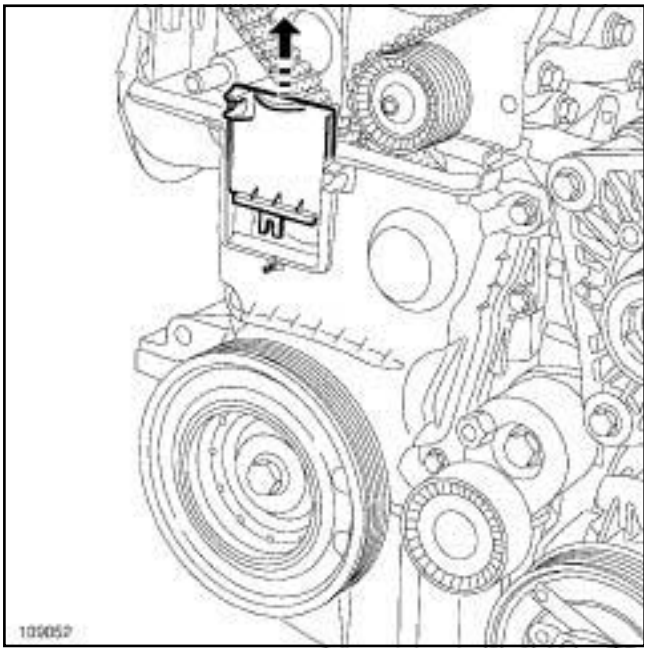
❑ Torque and angle tighten:

- the **new bolt of the crankshaft accessories pulley (40 N.m + 145° ± 15°)**,

- the **nut of each camshaft sprocket (30 N.m + 84° ± 4°)**.

K4M

c - Lower timing cover with a timing flap



109052

❏ Remove the timing flap from the lower timing cover.

d - continuation of the refitting procedure regardless of the type of lower timing cover

❏ Remove:

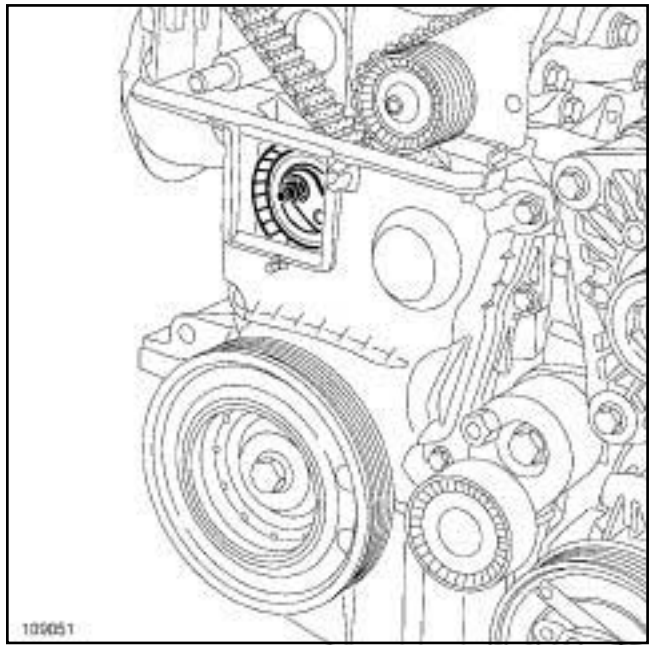
- the bolt of the tool,
- the,
- the toolfrom the cylinder block,
- the.

4 - Checking the tension

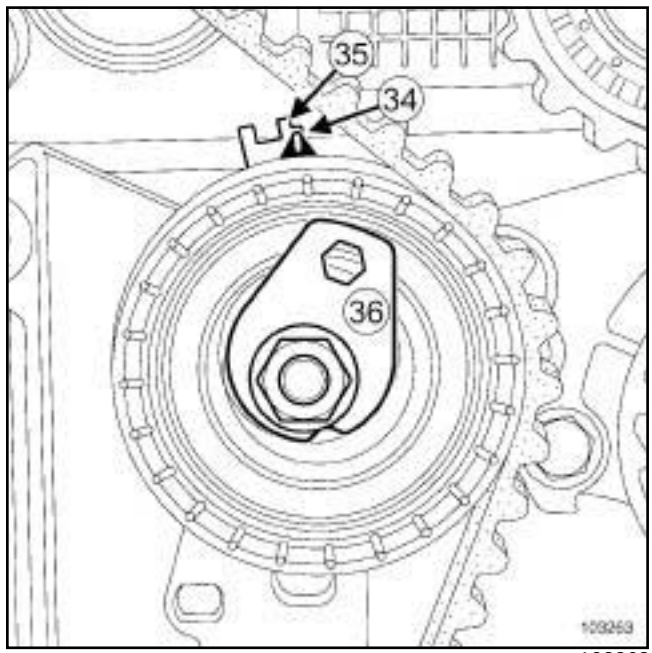
❏ Rotate the crankshaft twice clockwise at the timing end and before aligning the marks made previously by the operator (on the camshaft dephaser), screw the toolinto the cylinder block.

❏ Move the crankshaft slowly and smoothly until it comes into contact with the tool.

❏ Remove the toolfrom the cylinder block.



109051



103263

❏ Check that the adjustable index (**34**) is opposite the notch (**35**) , if this is not the case:

- loosen the timing tensioning roller nut by up to one turn while holding the eccentric with an Allen key,
- gradually move the adjustable index marker (**34**) opposite the mark (**35**) turning the eccentric cam (**36**) clockwise.

❏ Torque tighten the **timing tensioning roller nut (27 N.m)**.

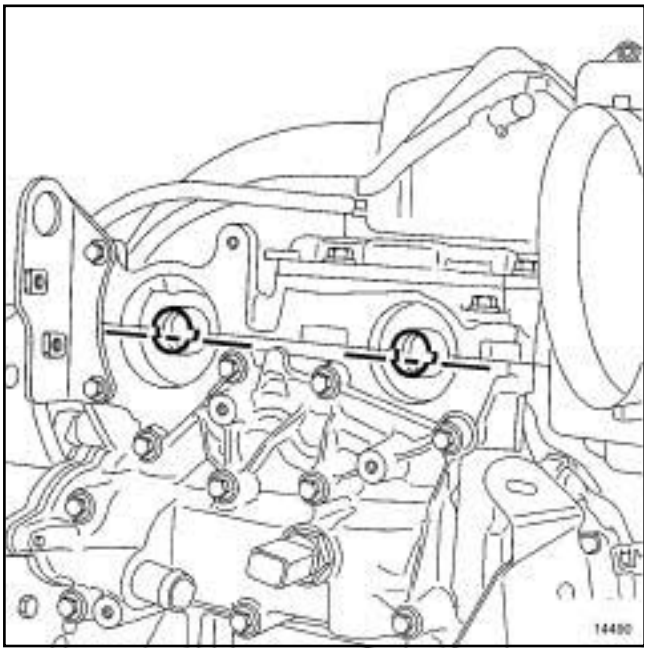
K4M

5 - Checking the timing

❑ Ensure that the index and the notch on the timing tensioning roller are in the correct position before checking the timing.

❑ Screw toolinto the cylinder block.

❑ Move the crankshaft slowly and smoothly until it comes into contact with the tool.



14490

❑ Position (without forcing) the(the camshaft end grooves must be horizontal and offset downwards).

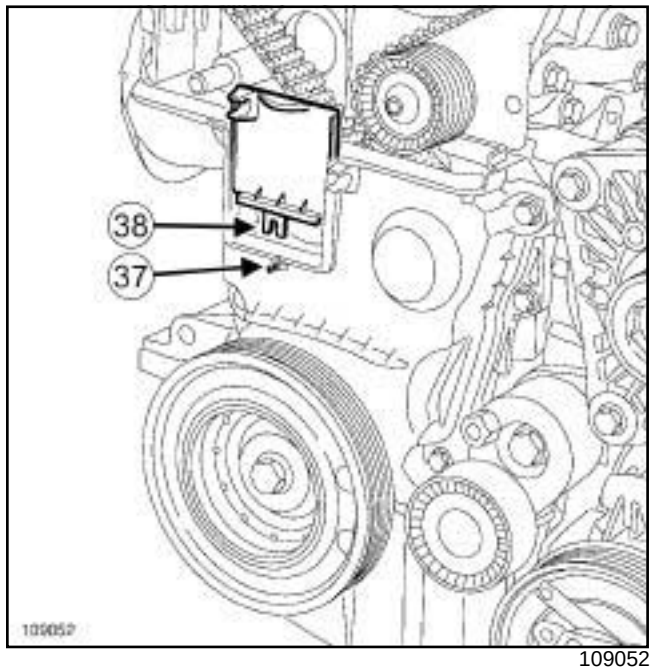
Note:

If thecannot be engaged, readjust the timing and the tension.

❑ Remove:

- the setting tool,
- thefrom the cylinder block.

a - Lower timing cover with a timing flap



109052

❑ Refit the lower timing cover flap, checking that the locating pin (**37**) fits properly in the notch (**38**) .

b - Lower timing cover without a timing flap

❑ Refit the lower timing cover.

❑ Tighten to torque the **lower timing cover bolts (12 N.m)**.

III - FINAL OPERATION

❑ Apply a drop of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the thread of the TDC pin plug.

❑ Tighten to torque the **TDC pin plug (20 N.m)**.

❑ Refit the upper timing cover.

❑ Torque tighten:

- the **upper timing cover bolts (46 N.m)**,
- the **upper timing cover nuts (46 N.m)**.

❑ Refit:

- a new inlet camshaft plug using the,
- a new exhaust camshaft plug using the,
- the engine lifting eye at the flywheel end.

❑ Torque tighten the **flywheel end lifting eye bolts (10 N.m)**.

K4M

❑ Refit:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the air inlet duct.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 796

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.
Mot. 1489	TDC locating pin.
Mot. 1430	Set of 5 crankshaft and camshaft pulley timing pins.

Tightening torques ▽	
timing belt tensioning roller bolt	**27 N.m**
accessories pulley M14 bolt	**120 N.m + 95° ± 15°**
timing belt tensioning roller bolt	**27 N.m**
TDC pin plug	**25 N.m**
right-hand suspended engine mounting bolts	**25 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for the repair**) .

IMPORTANT
Wear protective gloves during every operation.

WARNING
Never run the engine in the opposite direction to that of normal operation.

WARNING
Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

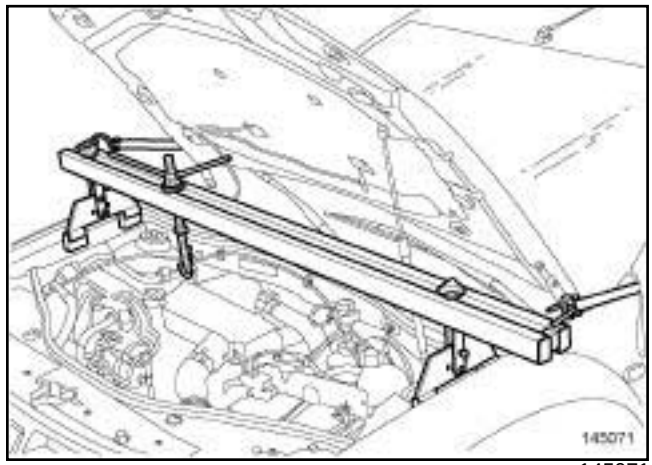
REMOVAL

I - REMOVAL PREPARATION OPERATION

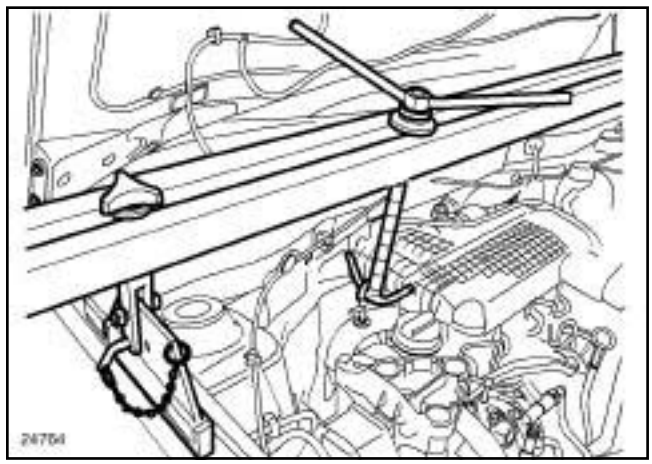
❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).



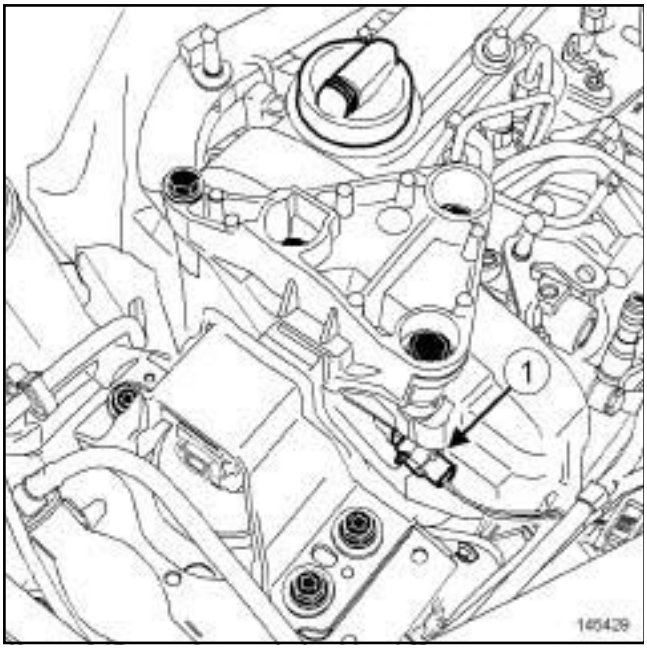
145071



24764

❑ Fit the engine support tool **(Mot. 1453)** with the retaining belt, taking the timing end lifting eye as an anchoring point.

K9K, and 796

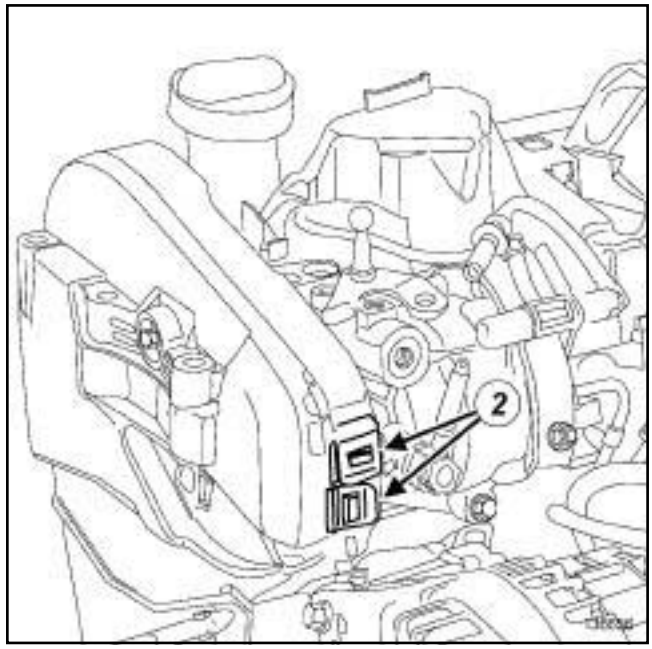


145429

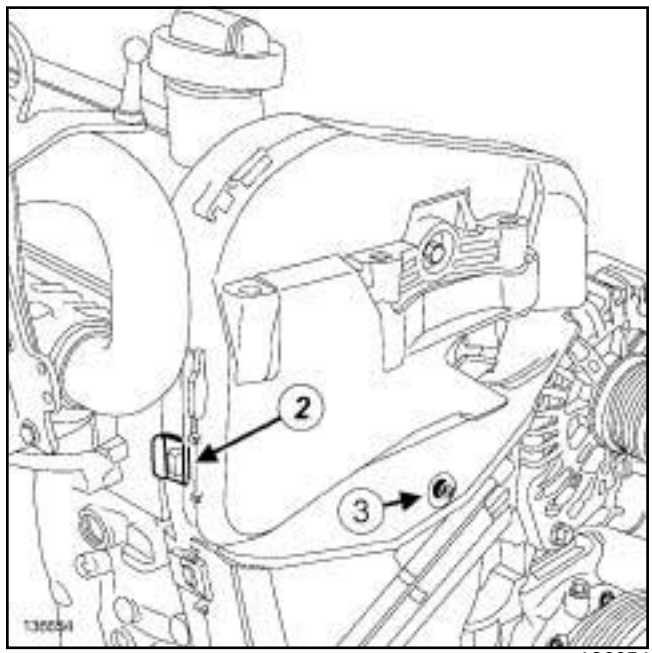
❑ Mark the position of the suspended engine mounting in relation to the body.

❑ Remove:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the camshaft position sensor (**1**) (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .



136656

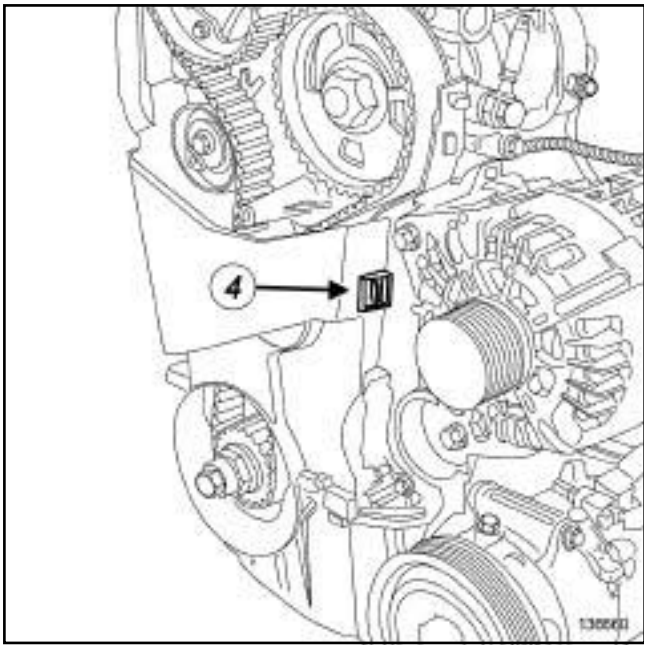


136654

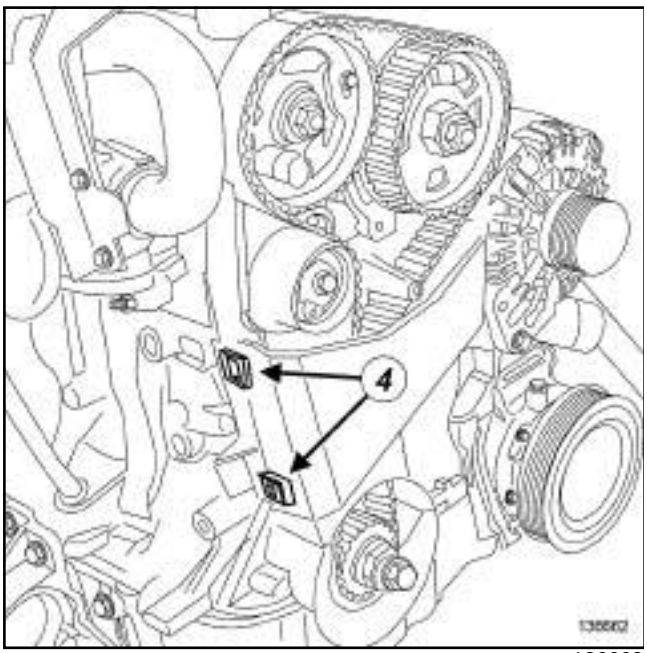
❑ Remove:

- the bolt (**3**) from the upper timing cover,
- the upper timing cover by unclipping the three tabs (**2**) .

K9K, and 796



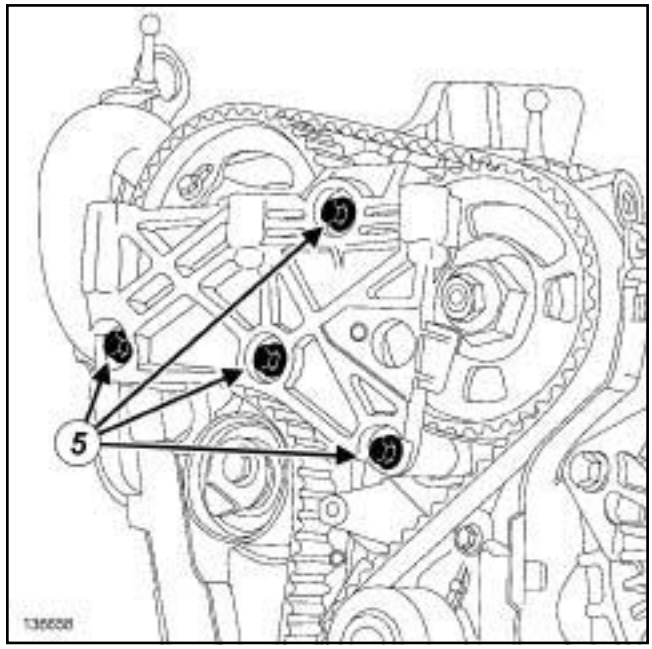
136660



136662

❑ Unclip the three tabs (**4**) .

❑ Remove the lower timing cover.

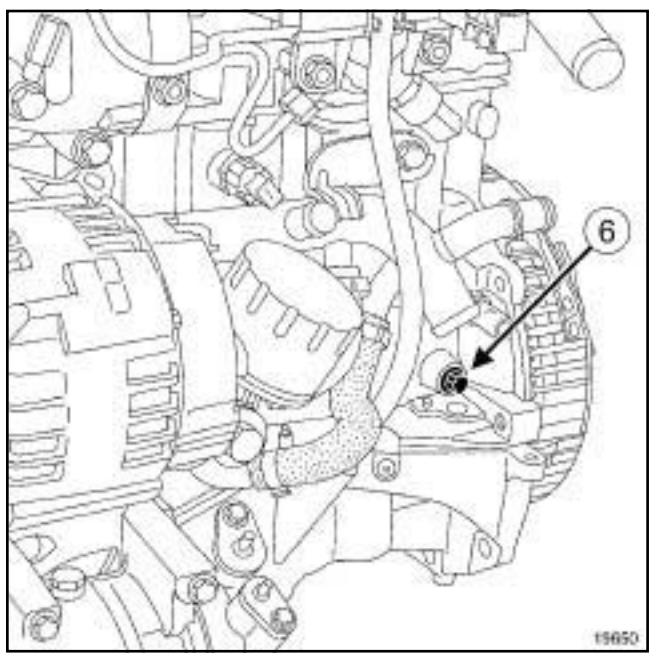


136658

❑ Remove:

- the bolts (**5**) from the right-hand suspended engine mounting support on the cylinder head,
- the right-hand pendulum suspension support.

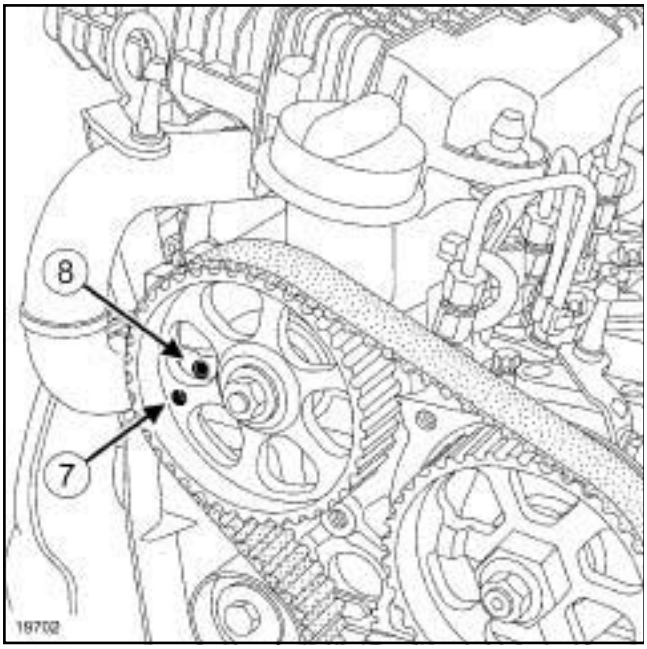
II - REMOVAL OPERATION



19650

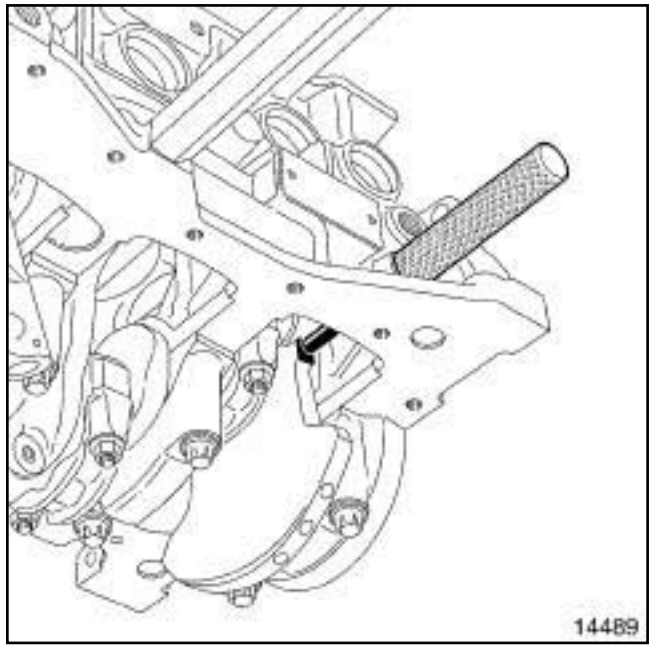
❑ Remove the TDC pin plug (**6**) using a **14** female torx socket.

K9K, and 796



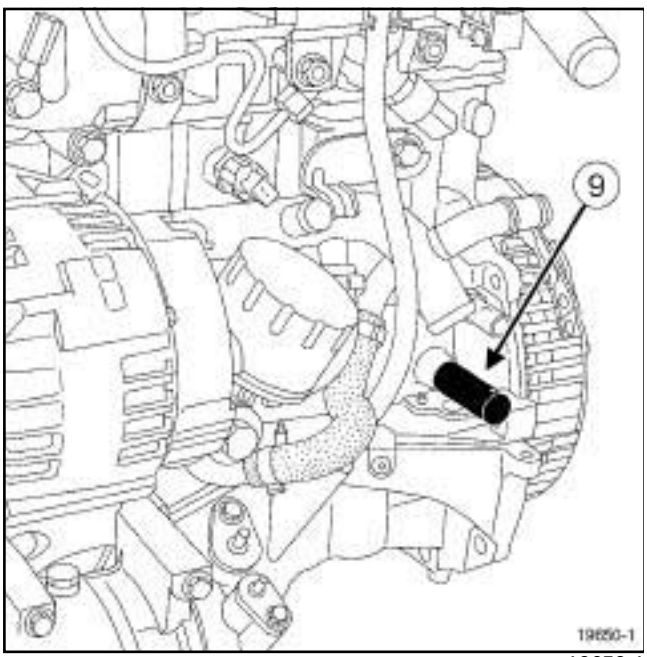
19702

❏ Turn the crankshaft to position the camshaft pulley hole (**7**) almost opposite the cylinder head hole (**8**) .



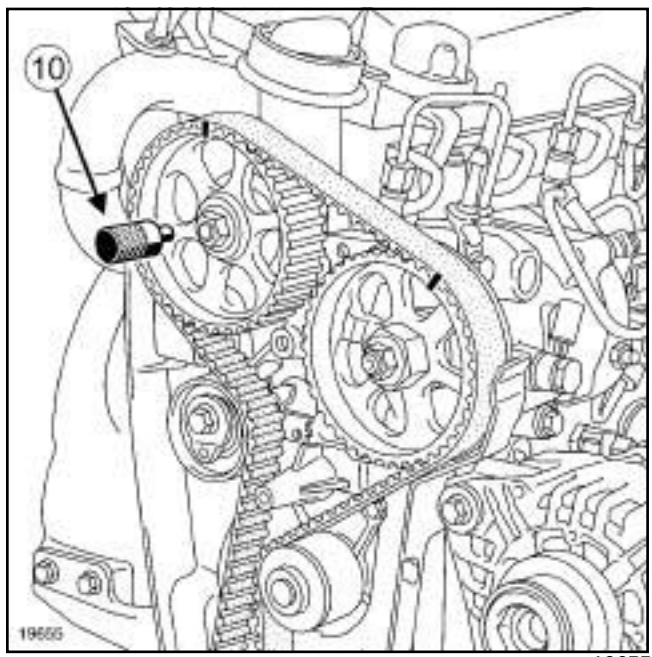
14489

❏ Turn the crankshaft clockwise (timing end) smoothly until the crankshaft is against the **(Mot. 1489)**.



19650-1

❏ Screw tool **(Mot. 1489)** (**9**) into the cylinder block.



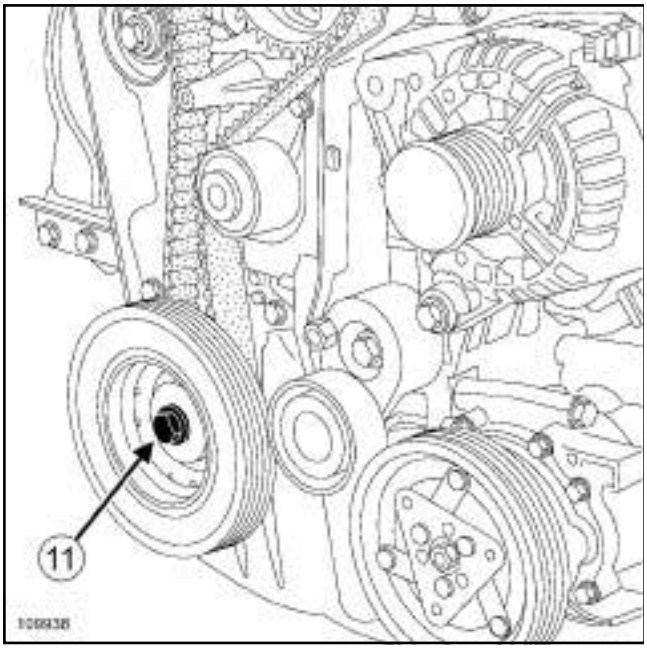
19655

❏ Insert the **(Mot. 1430)** (**10**) in the holes of the camshaft pulley and cylinder head.

❏ Remove:

- the **(Mot. 1430)**,
- the **(Mot. 1489)**.

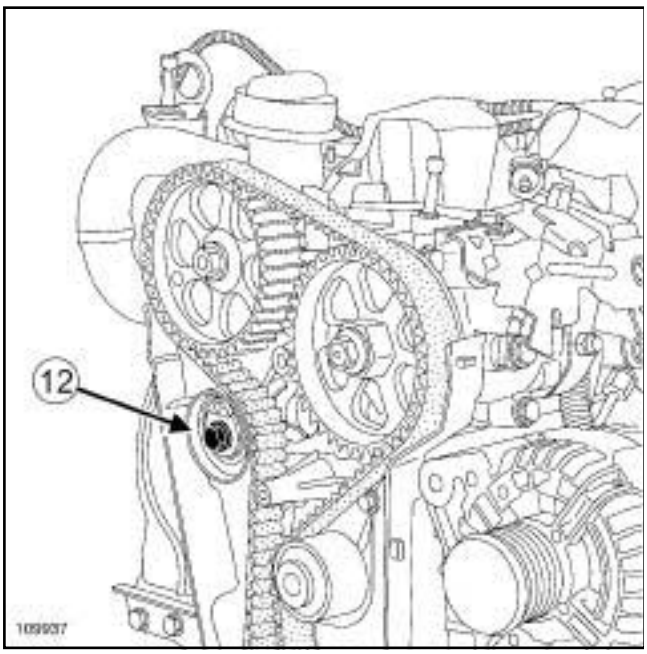
K9K, and 796



109938

❑ Remove:

- the bolt (**11**) from the crankshaft accessories pulley, locking the flywheel using a large screwdriver,
- the crankshaft accessories pulley.



109937

❑ Undo the timing belt tensioning roller bolt (**12**) .

❑ Loosen the timing belt tensioning roller by turning the eccentric cam using a **6 mm** Allen key.

❑ Remove:

- the timing belt taking care not to let the crankshaft timing sprocket fall out.
- the timing belt tensioning roller.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

WARNING
The belt must be replaced with a new one if it has been removed.

WARNING
When replacing the belt, always replace the tension wheels and idler pulleys.

WARNING

Always degrease:

- the end of the crankshaft (timing end),
- the timing sprocket pressure faces and bore of the crankshaft,
- the contact surfaces of the crankshaft accessories pulley.

This is to avoid timing slippage.

This slippage leads to engine damage.

II - PARTS AND CONSUMABLES FOR THE REPAIR

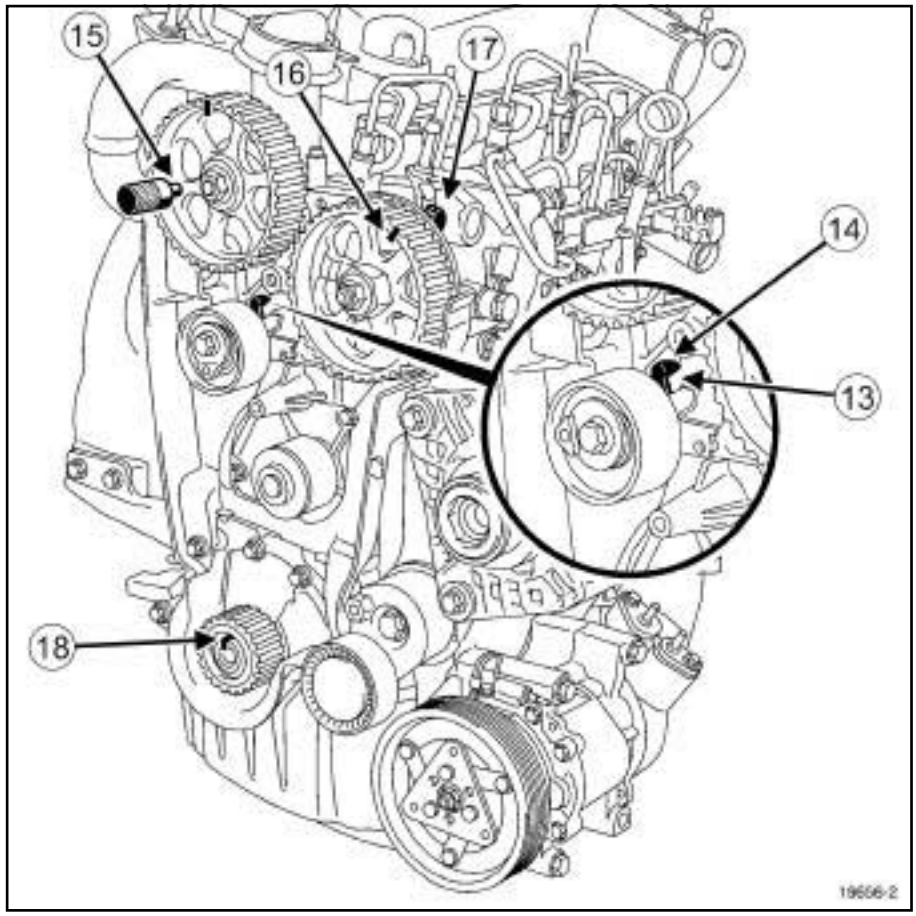
❑ **parts always to be replaced: Crankshaft accessories pulley bolts**,

❑ **parts always to be replaced: Timing belt tensioning roller**,

❑ **parts always to be replaced: Timing belt**.

K9K, and 796

III - REFITTING OPERATION



19656-2

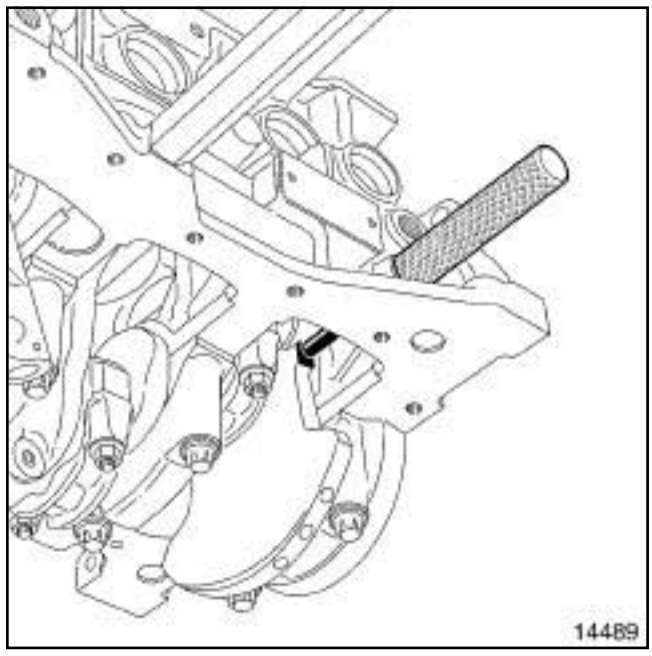
❏ Refit:

- the crankshaft timing sprocket,
- a new timing belt tensioning roller.

❏ Put the tensioning roller lug (**13**) in the cylinder head groove (**14**) .

❏ Engage the **(Mot. 1430)** in the camshaft pulley hole and the cylinder head hole at (**15**) , turning the camshaft using an **18 mm** offset wrench if necessary.

❏ Check that high-pressure pump pulley marking (**16**) is opposite the bolt head (**17**) .

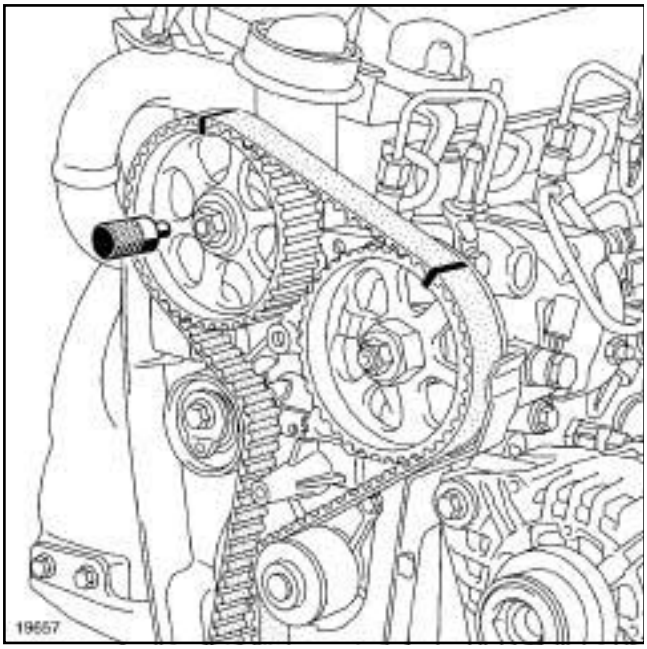


14489

❏ Refit the **(Mot. 1489)**.

❏ Place the crankshaft against the **(Mot. 1489)** (the crankshaft groove ***(18)*** must be upwards).

K9K, and 796

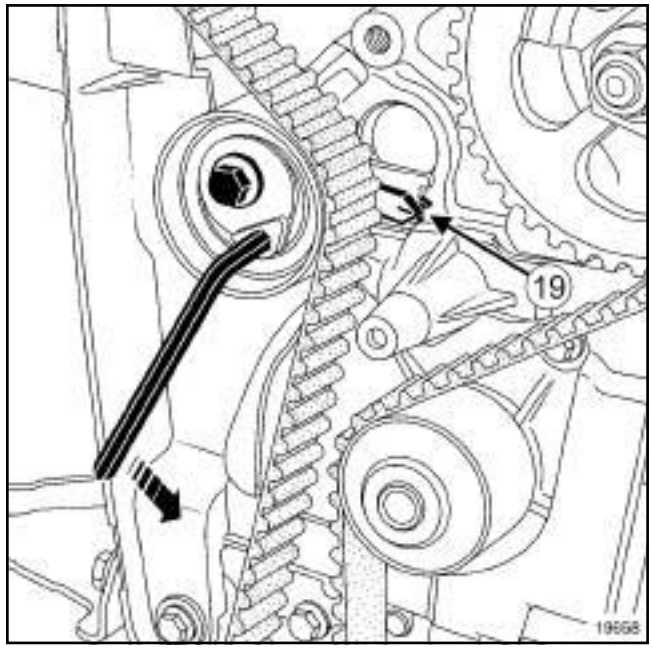


19657

❑ Fit the new timing belt, starting with the crankshaft sprocket, aligning the marks on the belt with those on the camshaft and high pressure pump pulleys.

Note:

There must be **19 timing belt tooth grooves** between the marks of the camshaft and high pressure pump pulleys and **51 timing belt tooth grooves** between the marks of the crankshaft timing sprocket and the high pressure pump pulley.



19658

❑ Position the timing belt tensioning roller adjustable index opposite the lug (**19**) by turning the eccentric cam anti-clockwise using a **6 mm** Allen key.

❑ Torque tighten the **timing belt tensioning roller bolt (27 N.m)**.

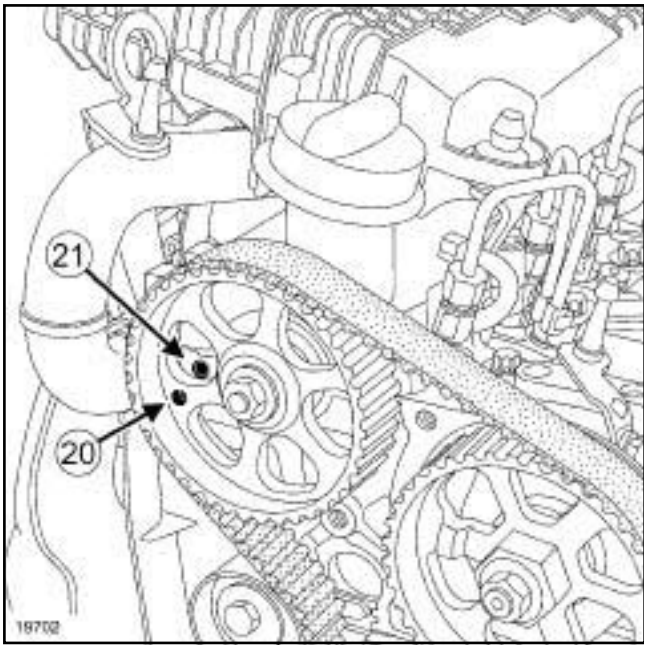
❑ Refit the accessories crankshaft pulley with a new bolt.

❑ Torque and angle tighten (crankshaft against the **(Mot. 1489)**) the **accessories pulley M14 bolt (120 N.m + 95° ± 15°)**.

❑ Remove:

- the **(Mot. 1430)**,
- the **(Mot. 1489)**.

K9K, and 796

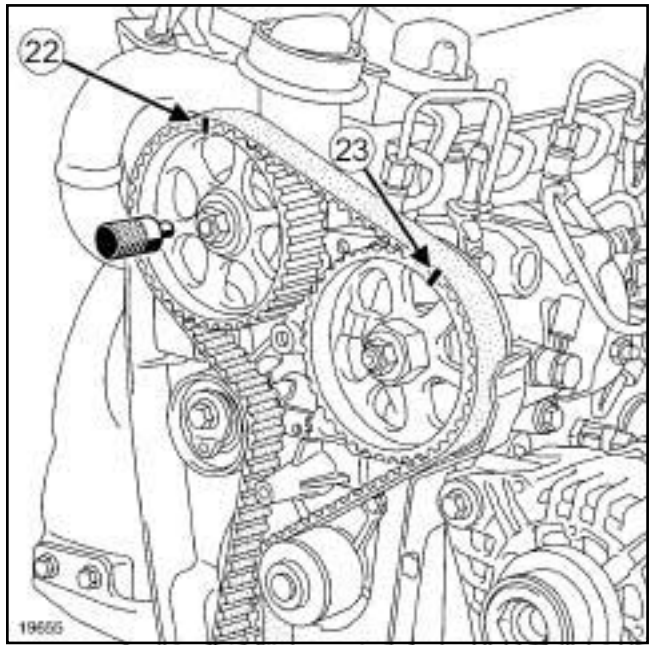


19702

❏ Rotate the crankshaft clockwise through two revolutions (timing end).

❏ Before the camshaft pulley hole (**20**) is opposite the cylinder head hole (**21**) , screw the **(Mot. 1489)** into the cylinder block.

❏ Bring the crankshaft slowly and smoothly into contact with the tool **(Mot. 1489)**.



19655

❏ Set the camshaft pulley using the **(Mot. 1430)**.

Note:

There should be **19 belt tooth grooves** between the marks on the camshaft pulley (**22**) and the high pressure pump pulley (**23**) .

❏ Remove:

- the **(Mot. 1489)**,
- the **(Mot. 1430)**.

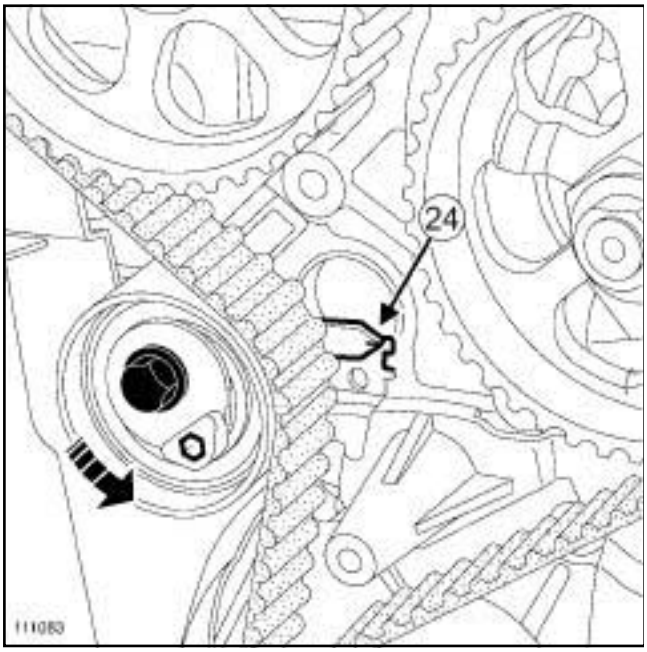
Note:

After rotating the crankshaft through two revolutions, the tensioning roller adjustable index may be in one of two positions.

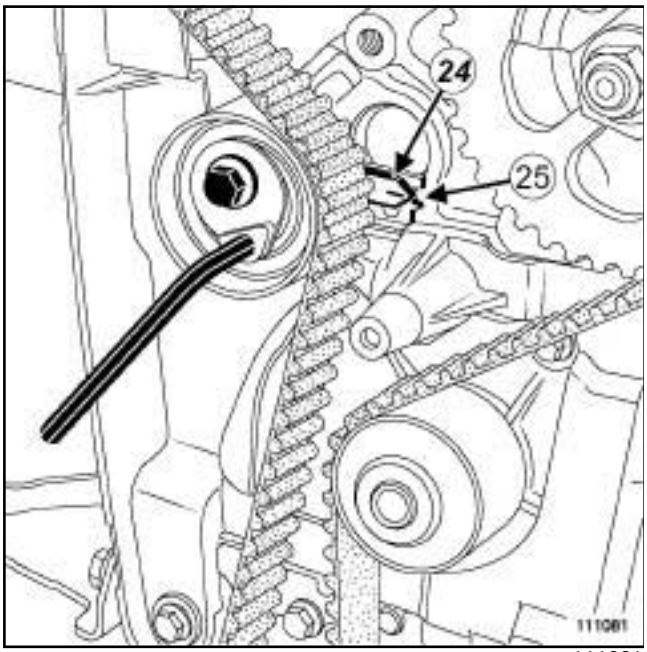
The rotation of the tension wheel eccentric depends on the position.

K9K, and 796

1 - First position



111083



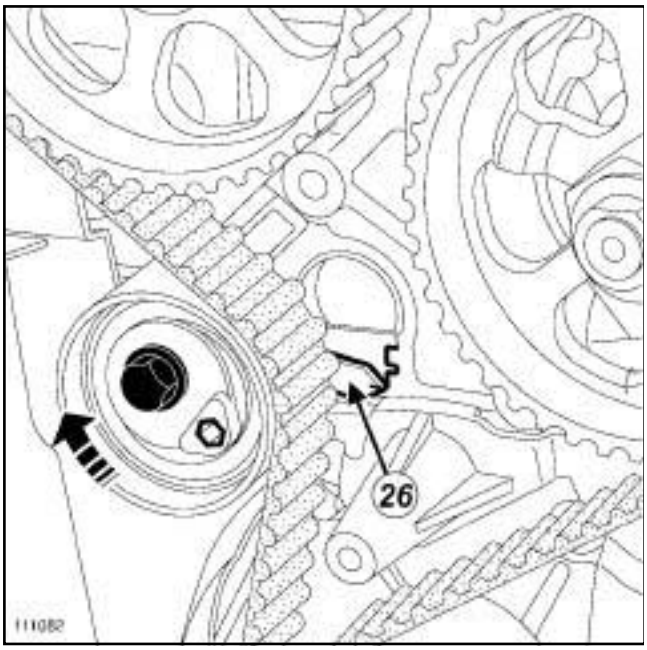
111081

❏ Loosen the tensioning roller bolt by no more than one turn, holding it with a **6 mmAllen key.**

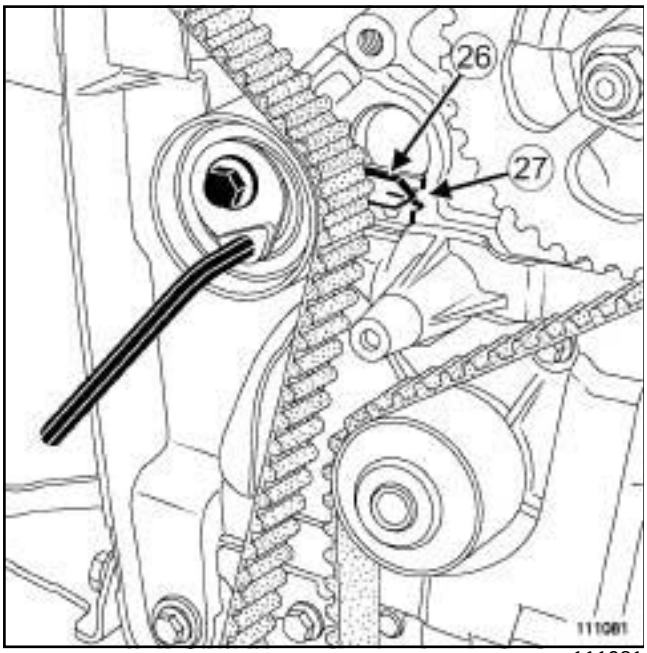
❏ Gradually align the adjustable index marker (**24**) in the middle of the timing window (**25**) , turning the key anti-clockwise.

K9K, and 796

2 - Second position



111082



111081

❑ Loosen the tensioning roller bolt by one turn, holding it with a **6 mm** Allen key.

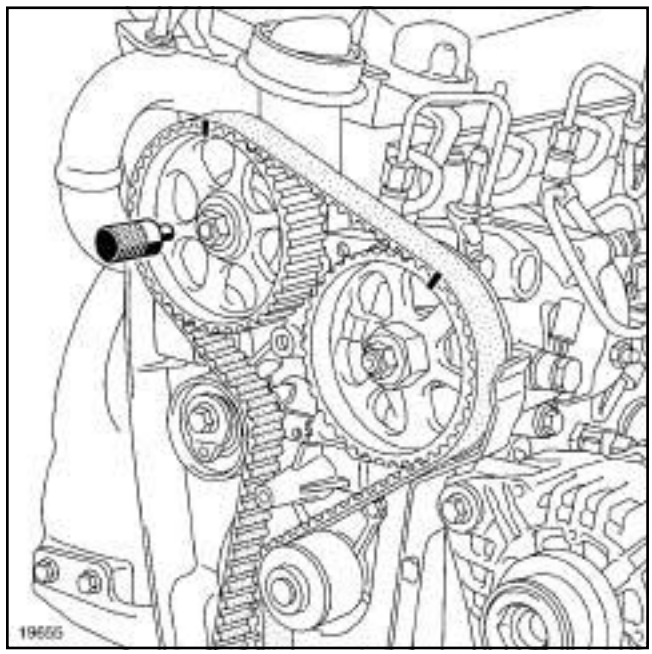
❑ Gradually align the adjustable index marker (**26**) in the middle of the timing window (**27**) , turning the key clockwise.

❑ Torque tighten the **timing belt tensioning roller bolt (27 N.m)**.

❑ Rotate the crankshaft clockwise through two revolutions (timing end).

❑ Before the camshaft pulley hole is opposite the cylinder head hole, screw the **(Mot. 1489)** into the cylinder block.

❑ Bring the crankshaft slowly and smoothly into contact with the tool **(Mot. 1489)**.



19655

❑ Set the camshaft pulley using the **(Mot. 1430)**.

❑ If the tool **(Mot. 1430)** does not engage, repeat the timing belt refitting operation.

❑ Remove:

- the **(Mot. 1489)**,
- the **(Mot. 1430)**.

IV - FINAL OPERATION

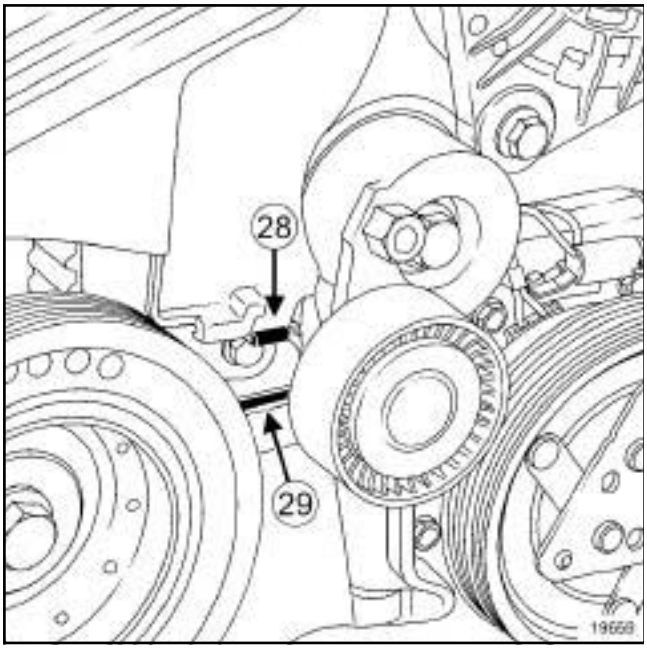
❑ Place a drop of **SILICONE ADHESIVE SEALANT** (see **Vehicle: Parts and consumables for the repair**) on the threading of the TDC pin plug.

❑ Torque tighten the **TDC pin plug (25 N.m)**.

❑ Refit the right-hand suspended engine mounting support on the cylinder head.

❑ Torque tighten the **right-hand suspended engine mounting bolts (25 N.m)**.

K9K, and 796



19659

❏ Refit the lower timing cover, positioning the tab (**28**) in the opening (**29**) on the inner cover.

❏ Clip on the lower timing cover.

❏ Refit:

- the upper timing cover,
- the upper timing cover bolt.

❏ Clip on the upper timing cover.

❏ Refit:

- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) , observing the marks made during removal.

❏ Remove the engine support tool **(Mot. 1453)**.

❏ Refit the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Tightening torques ▽	
rocker cover bolts 22, 23, 20 and 13	**8 N.m**
rocker cover bolts 1 to 12, 14 to 19, 21 to 24	**15 N.m**
rocker cover bolts 22, 23, 20 and 13	**15 N.m**
flywheel end lifting eye bolts on the rocker cover	**11 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

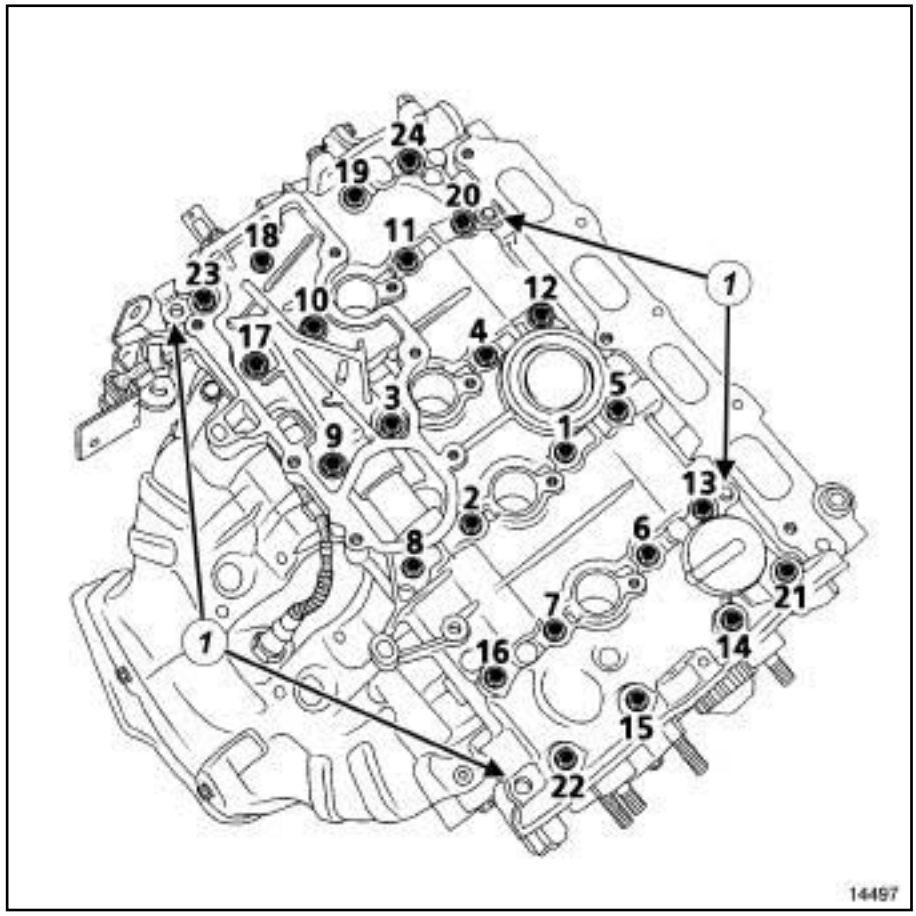
❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the timing end camshaft seals (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-56**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-68**) ,
- the flywheel end lifting eye on the rocker cover.

K4M

II - REMOVAL OPERATION



14497

- ❏ Remove the rocker cover bolts.
- ❏ Remove the rocker cover vertically by tapping the lugs (**1**) with a copper hammer.
- ❏ Remove the rocker cover.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑

IMPORTANT
Wear cut-resistant gloves during the operation.

IMPORTANT
Wear goggles with side protectors for this operation.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
Do not allow this product to drip onto the paintwork.

Clean the cylinder head carefully to prevent foreign bodies from entering the oil supply and return galleries.

Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

Note:

The gasket faces on the rocker cover must be clean, dry and free from grease (avoid finger marks).

❑ Clean the gasket face of the rocker cover and cylinder head with **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to dissolve any pieces of seal that are still attached.

❑ Apply the product to the section to be cleaned.

❑ Wait approximately fifteen minutes, then remove any residue with a wooden spatula.

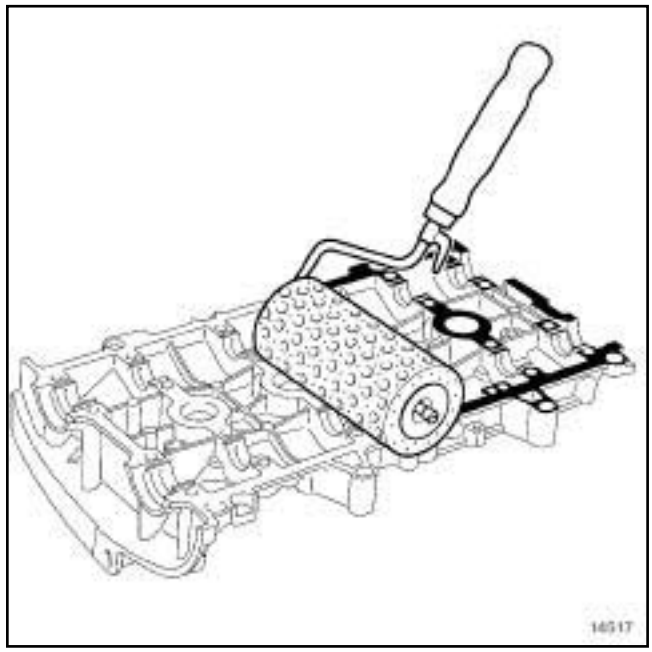
❑ Lubricate the cylinder head camshaft bearings with engine oil.

❑

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.)

Note:

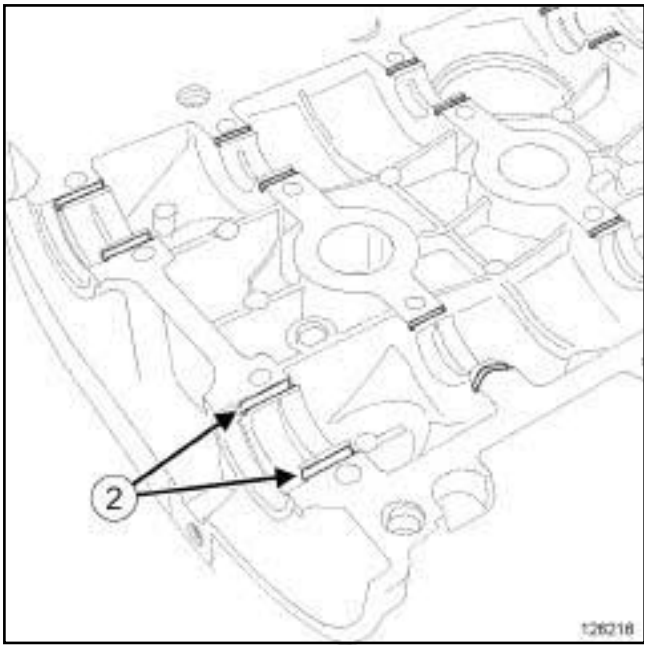
Do not put oil on the gasket face of the cylinder head cover.



14517

❑ Using a stipple roller, apply **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the gasket face until it is well coated.

K4M

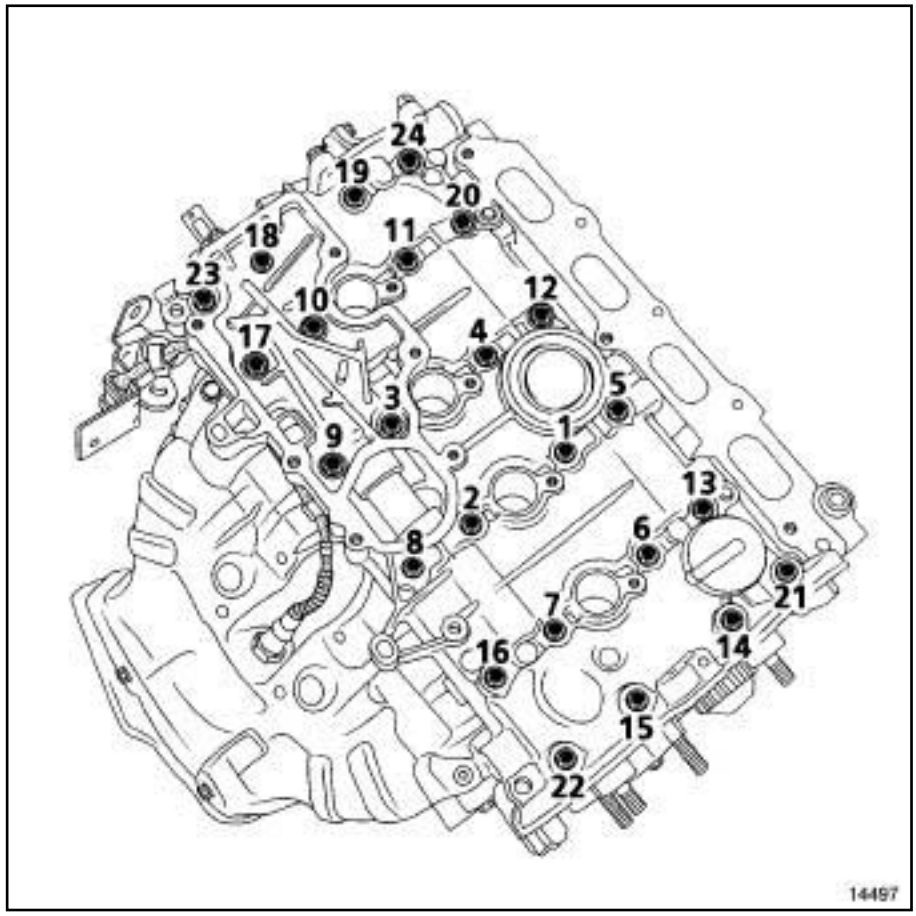


126216

❑ Use a cloth to remove any **RESIN GLUE** in the bearing channels (**2**) on the rocker cover.

K4M

II - REFITTING OPERATION



14497

❑ Refit the rocker cover.

❑ Tighten to torque and in order:

- **rocker cover bolts 22, 23, 20 and 13 (8 N.m)**,
- **rocker cover bolts 1 to 12, 14 to 19, 21 to 24 (15 N.m)**.

❑ Loosen bolts 22, 23, 20 and 13, in order.

❑ Torque tighten in order **rocker cover bolts 22, 23, 20 and 13 (15 N.m)**.

III - FINAL OPERATION

❑ Refit the flywheel end lifting eye.

❑ Torque tighten the **flywheel end lifting eye bolts on the rocker cover (11 N.m)**.

❑ Refit:

- the oil decanter (see **11A**, **Top and front of engine**, **Oil decanter: Removal - Refitting**, page **11A-68**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the camshaft seals (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-56**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

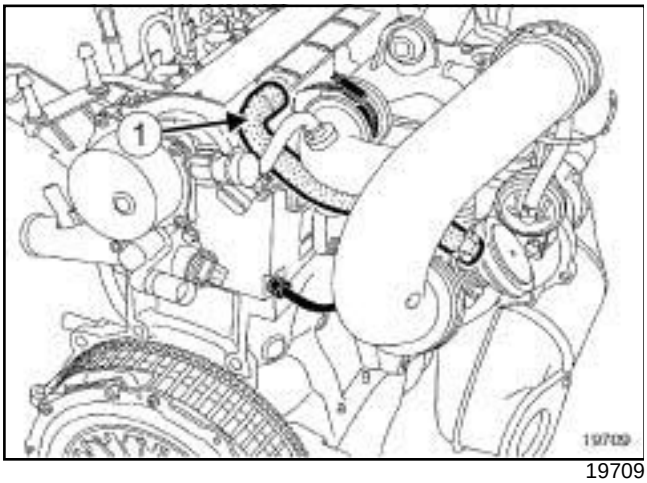
K9K

Tightening torques ▽	
rocker cover bolts	**12 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .



19709

❑ Remove the oil vapour rebreathing hose (**1**) .

II - REMOVAL OPERATION

❑ Remove:

- the rocker cover bolts,
- the rocker cover,
- the rocker cover seal.

REFITTING

I - REFITTING PREPARATION OPERATION

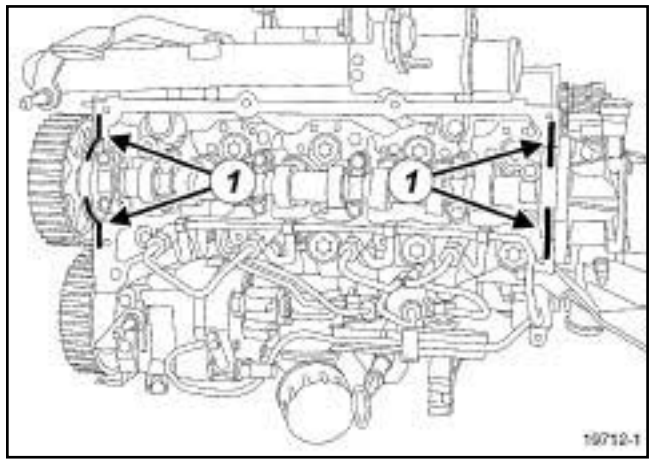
❑ Clean the cylinder head joint face using **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the cylinder head joint face,
- the housing of the rocker cover seal, if reusing.

❑ **parts always to be replaced: rocker cover seal**.

II - REFITTING OPERATION



19712-1

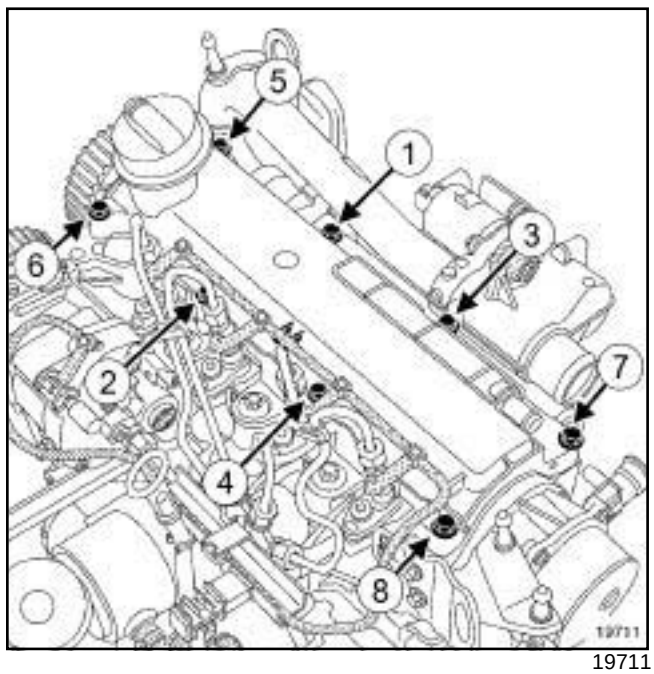
❑

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Deposit four beads (**1**) of **SILICONE ADHESIVE SEALANT** that are **2 mm** in diameter and **10 mm** long.

❑ Refit:

- the rocker cover,
- the rocker cover bolts.



19711

❑ Torque tighten in order the **rocker cover bolts (12 N.m)**.

K9K

III - FINAL OPERATION

❑ Connect the oil vapour rebreathing pipe.

❑ Refit the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

K4M

Equipment required
roller-type stud removal tool

Tightening torques ▽	
the camshaft dowel	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

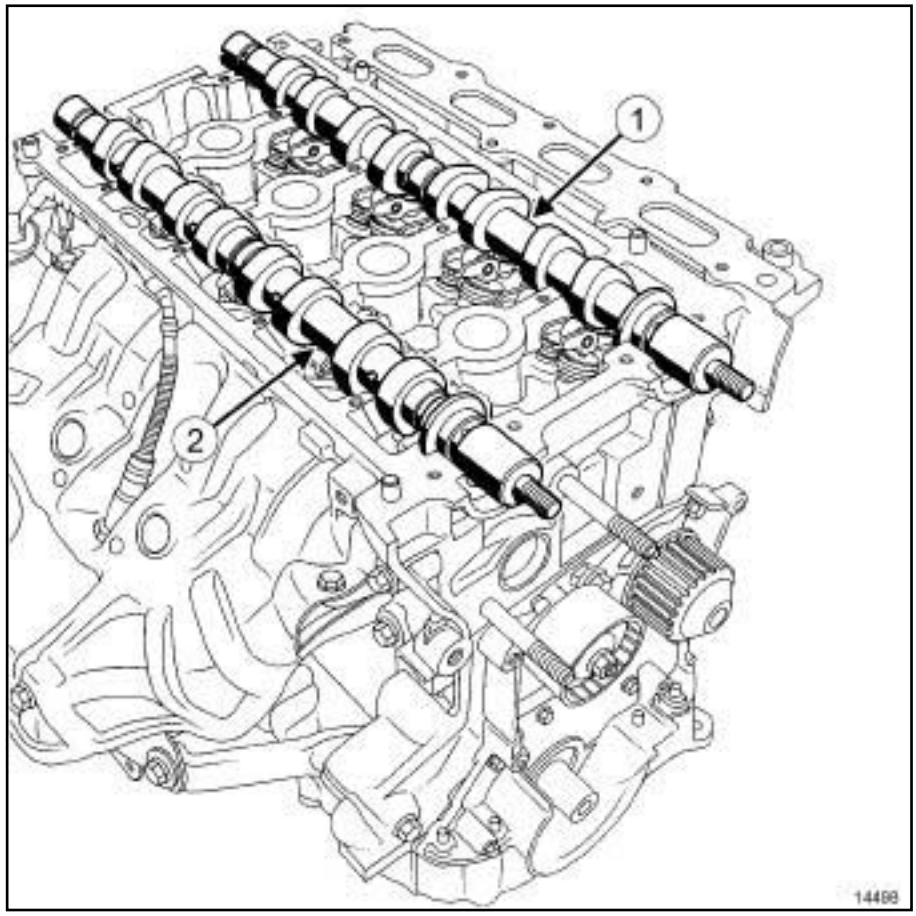
❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-42**) ,
- the timing end camshaft seals (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-56**) .

K4M

II - REMOVAL OPERATION

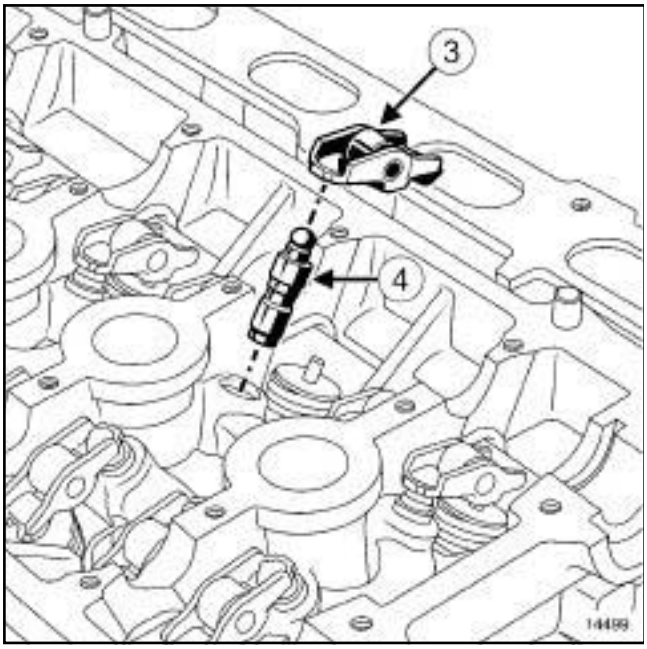


14498

❑ Remove:

- the inlet camshaft (**1**) ,
- the exhaust camshaft (**2**) .

K4M



14499

❑ Remove:

- the valve rockers (**3**) ;
- the hydraulic tappets (**4**) .

Note:

To prevent any risk of unpriming the hydraulic tappets make sure that they are vertical.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Refit the camshafts while positioning them correctly (see) (Technical Note 6023A, 10A, Engine and peripherals).

Note:

It is essential to reprime the hydraulic tappets as these may become drained if removed for a long time.

❑ To check if re-priming is necessary, press the top of the tappet with your thumb. If the tappet piston depresses, immerse the tappets in a container full of diesel then reprime them.

Replacing a camshaft dowel

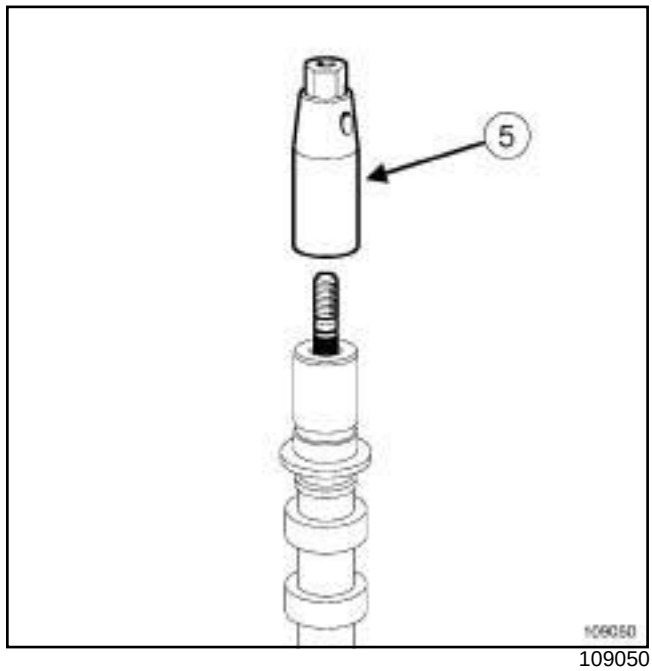
❑

Note:

It is essential to replace the camshaft dowel if it comes loose at the same time as the nut.

a - Removal

❑ Place the camshaft in a vice with **aluminium jaws**.



109050

❑ Remove the dowel using a **roller-type stud removal tool** (**5**) .

b - Cleaning the camshaft

❑

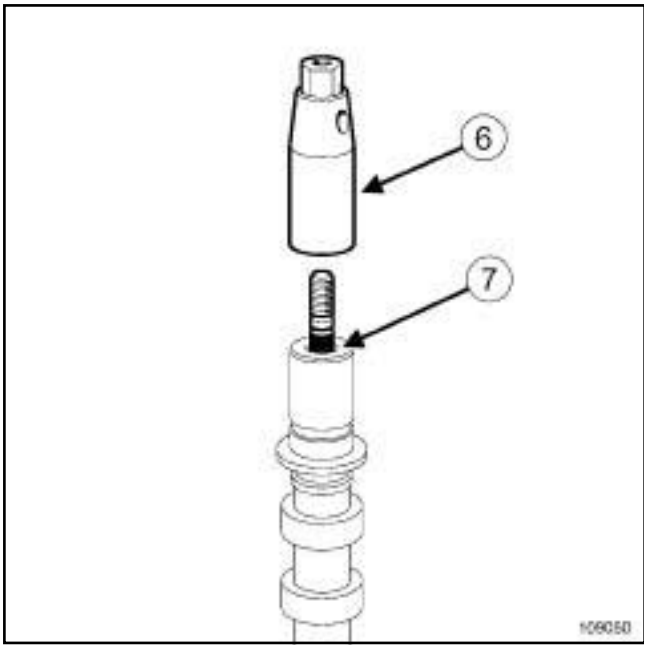
Note:

Clean the thread hole of the camshaft carefully to prevent foreign bodies from entering the latter.

Failure to follow this advice could lead to the blocking of the oil inlet holes, which would quickly result in engine damage.

c - Refitting

❑ Place the camshaft in a vice with **aluminium jaws**.



109050

❏ Refit the new camshaft dowel (precoated section (**7**) on the camshaft side).

❏ Torque tighten **the camshaft dowel (8 N.m)** using a **roller-type stud removal tool** (**6**) .

II - REFITTING OPERATION

❏ Refit:

- the hydraulic tappets,
- the valve rockers,
- the inlet camshaft, by lubricating the inlet camshaft bearings,
- the exhaust camshaft, by lubricating the exhaust camshaft bearings.

III - FINAL OPERATION

❏ Refit:

- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-42**) ,
- the camshaft seals (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-56**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Tightening torques ▽	
bolts of the camshaft bearings	**10 N.m**

REMOVAL

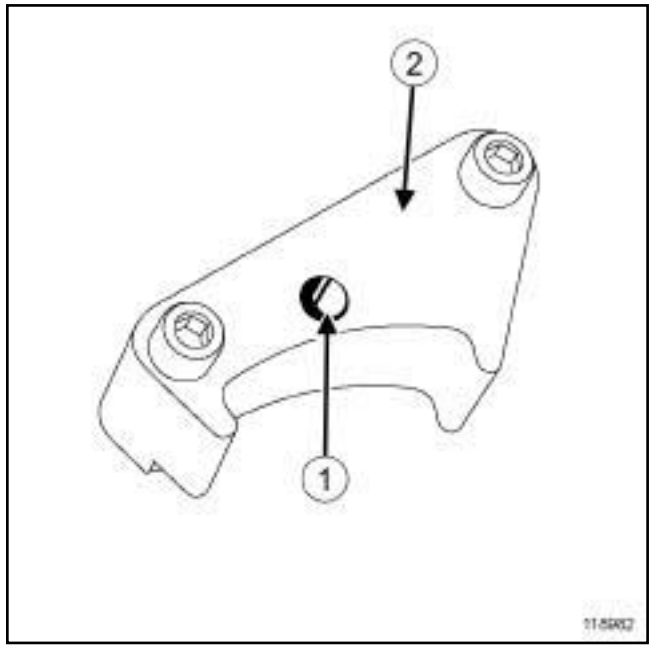
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

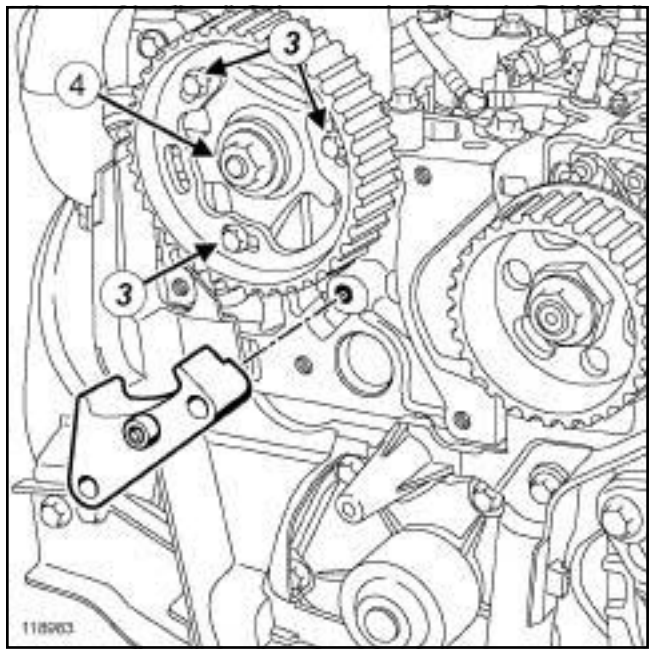
❏ Remove:

- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner partially (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-10**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-42**) .



118982

❏ Increase the hole (**1**) of the (**2**) using an **8.5 mm** drill bit.



118983

❏ Undo the camshaft pulley hub bolts (**3**) .

❏ Fit theon the cylinder head to lock the camshaft pulley wheel.

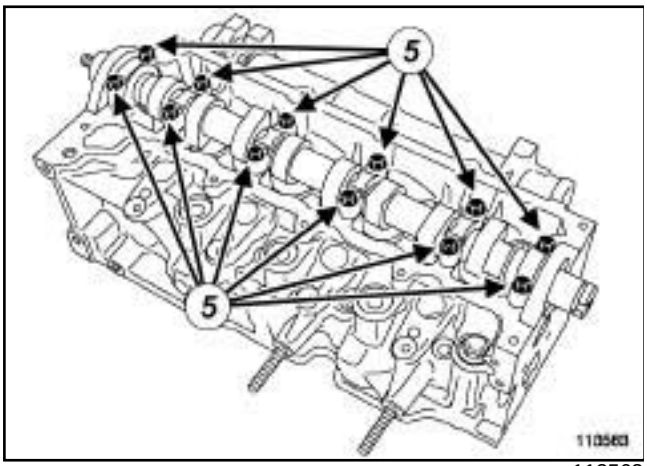
❏ Tighten the camshaft pulley hub bolts ***(3)*** .

❏ Remove:

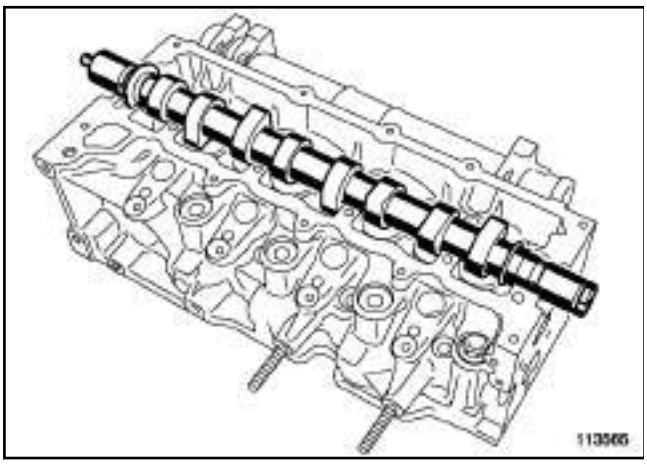
- the nut ***(4)*** from the camshaft pulley,
- the,
- the camshaft pulley.

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED



113563



113565

❑ Mark the position of the camshaft bearings.

❑ Remove:

- the camshaft bearing bolts ***(5)*** ,
- the camshaft bearings,
- the camshaft,
- the timing end camshaft seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Camshaft seal on timing end**.

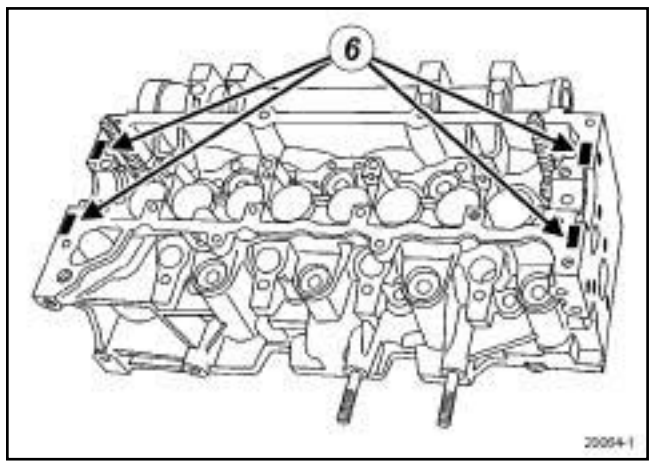
WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the bearing faces of the camshaft bearings.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the bearing faces of the camshaft bearings on the cylinder head,
- the bearing faces of the camshaft bearings on the camshaft bearings.



20064-1

❑

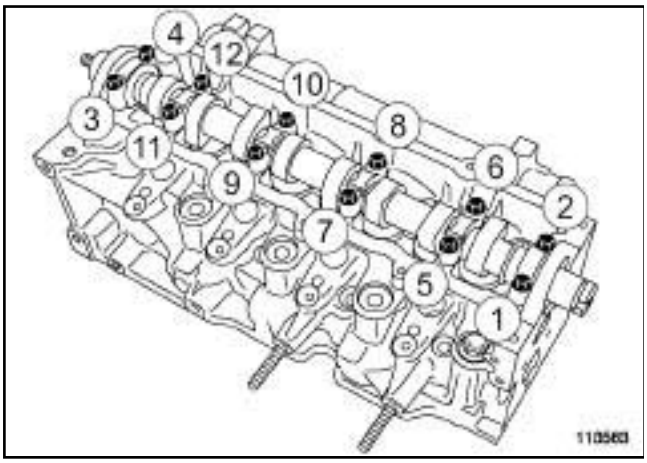
WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❏ Apply four beads (**6**) of **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) **7 mm** in diameter on the cylinder head.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Fit the camshaft in place by placing the camshaft groove on the timing end vertically and facing upwards.

❏ Refit the camshaft bearings, observing their original positions (bearing **No. 1** at the flywheel end).



113563

❏ Refit the camshaft bearing bolts (**1**) , (**3**) , (**4**) and (**2**) in order.

❏ Tighten the camshaft bearing bolts ***(1)*** , ***(3)*** , ***(4)*** and ***(2)*** in order.

❏ Refit the camshaft bearing bolts in order.

❏ Tighten to torque and in order the **bolts of the camshaft bearings (10 N.m)**.

❏ Check and adjust (if necessary) the valve clearance (see **Valves: Adjustment**) .

III - FINAL OPERATION

❏ Refit:

- the camshaft seal (see **11A**, **Top and front of engine**, **Camshaft seal, timing end: Removal - Refitting**, page **11A-56**) ,
- the rocker cover (see **11A**, **Top and front of engine**, **Rocker cover: Removal - Refitting**, page **11A-42**) ,
- the vacuum pump (see **Vacuum pump: Removal - Refitting**) (37A, Mechanical component controls),
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-10**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
inlet camshaft hub nut	**30 N.m + 84° ± 4°**
exhaust camshaft hub nut	**30 N.m + 84° ± 4°**

REMOVAL

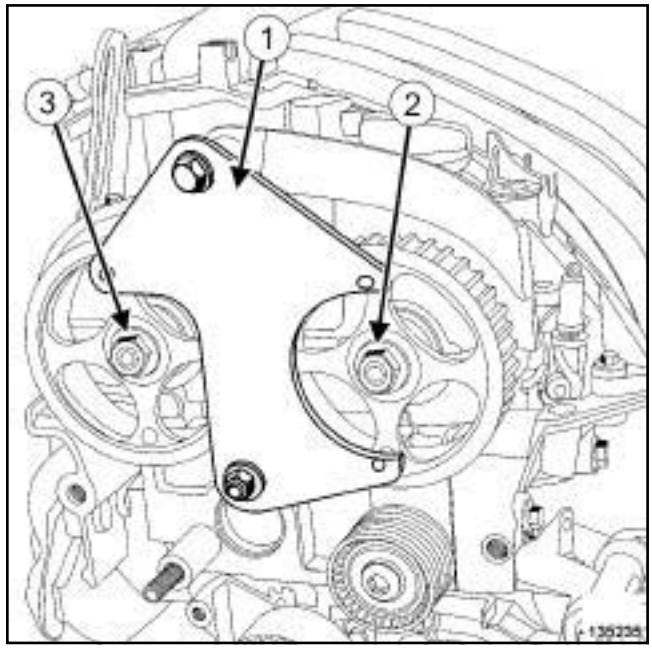
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the air inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) .



135235

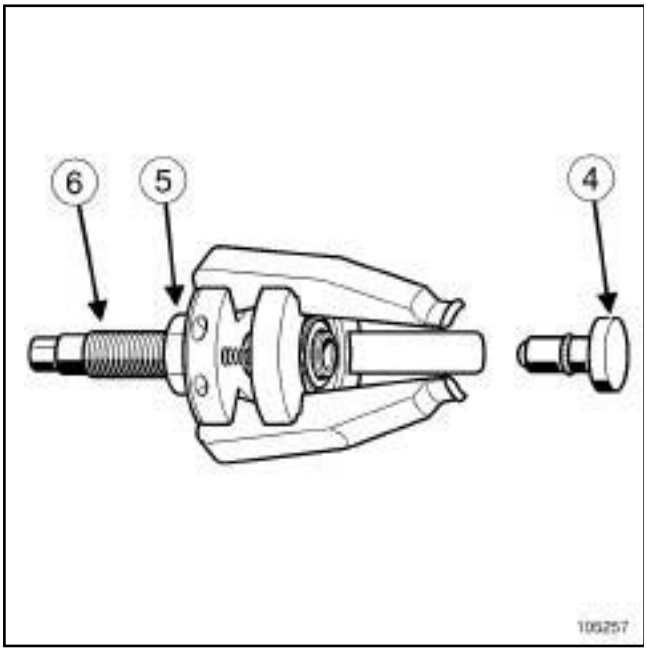
❏ Fit the locking tool (**1**) on the camshaft pulleys.

❏ Remove:

- the inlet camshaft pulley nut (**2**) ,
- the exhaust camshaft pulley nut (**3**) ,
- the,
- the inlet camshaft pulley,
- the exhaust camshaft pulley.

K4M

II - REMOVAL OPERATION



105257

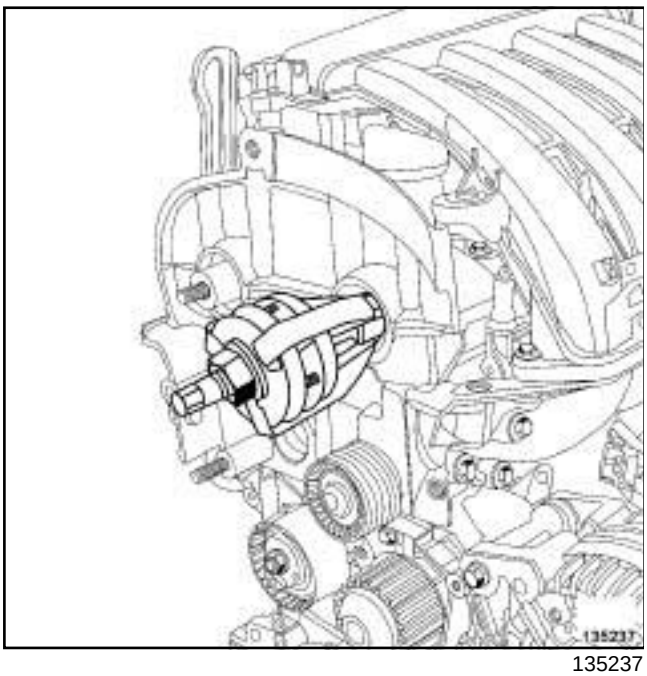
❑

Note:

The inlet and exhaust camshaft seals are removed using the.

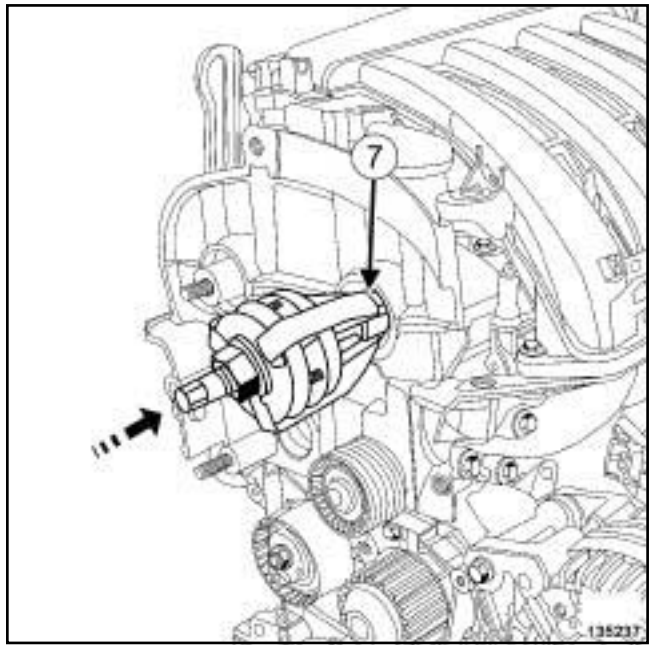
❑ Always remove the end piece (**4**) of the tool.

❑ Loosen bolts (**5**) and (**6**) fully from the.



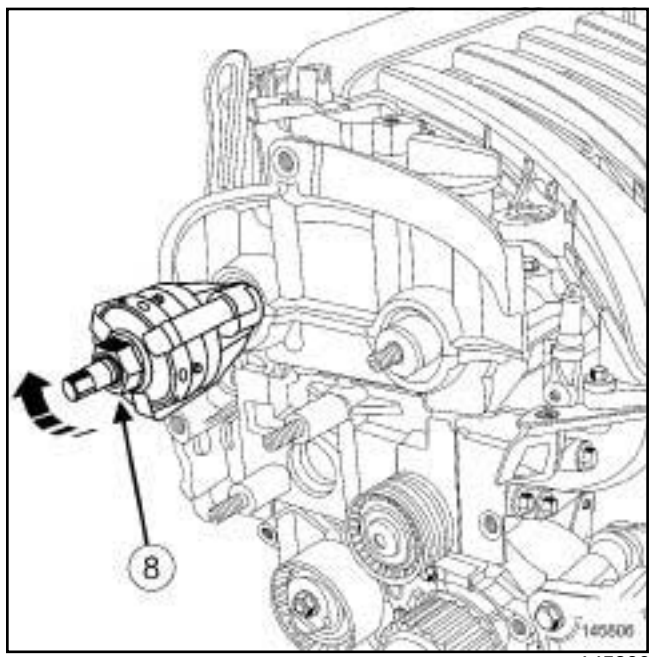
135237

❑ Position the claws of theon the camshaft.



135237

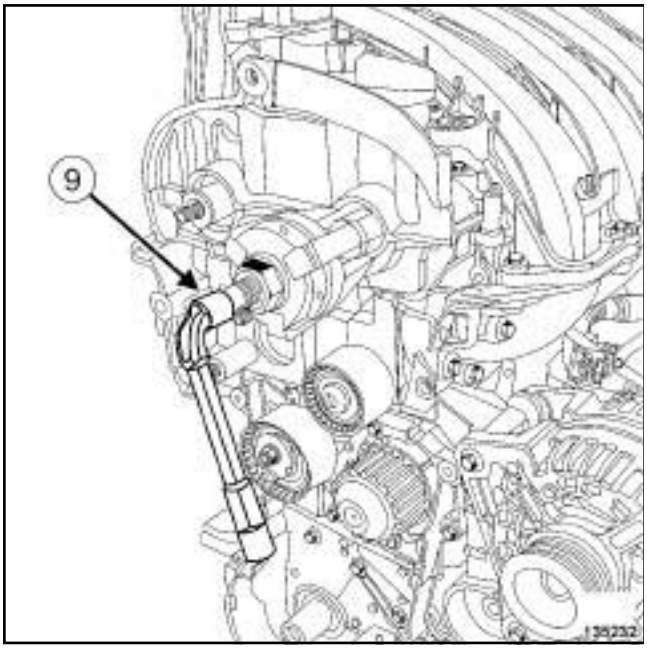
❑ Push theuntil contact is made between the ends of the claws (**7**) and the camshaft seal.



145806

❑ Separate the claws by turning the nut (**8**) clockwise using an open-jawed spanner.

K4M



135232

❑ Remove the camshaft seal by turning the bolt (**9**) clockwise.

❑ Repeat the previous operations for the other camshaft seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Camshaft seal on timing end**

❑ **parts always to be replaced: Exhaust camshaft pulley nut**

❑ **Always replace the inlet camshaft pulley nut.**

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

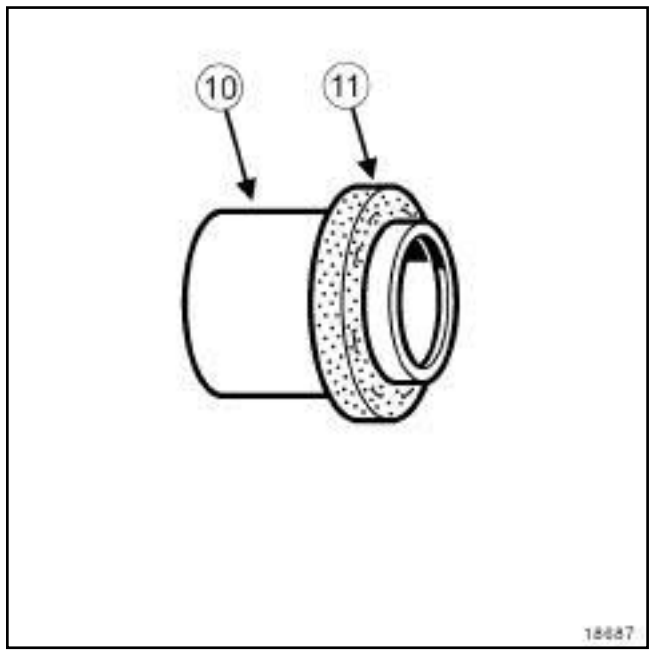
- the seal mating face of each camshaft,

- the camshaft seal housings.

Note:
It is strictly forbidden to lubricate the outer diameter of the ring before fitting.

II - REFITTING OPERATION

Fitting the camshaft seal.

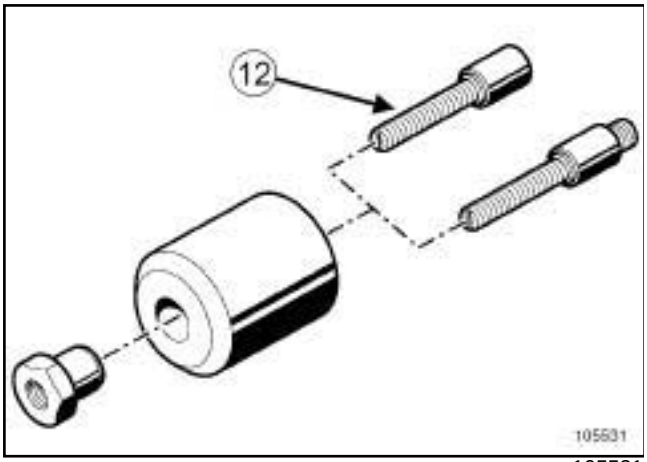


18687

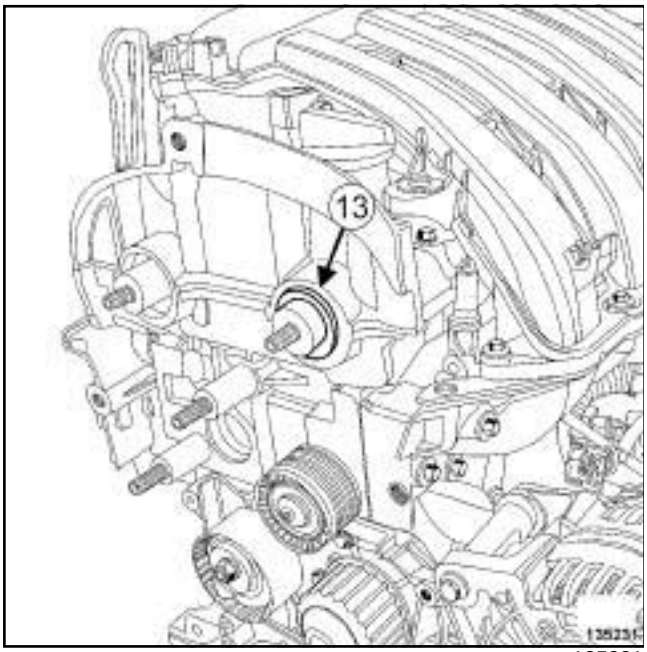
❑

Note:
Always hold the camshaft seal with the protector (**10**) when handling, as this type of seal is very fragile. It is strictly forbidden to touch seal; (**11**) this is to prevent any oil leaks once the oil seal is fitted to the engine.

K4M



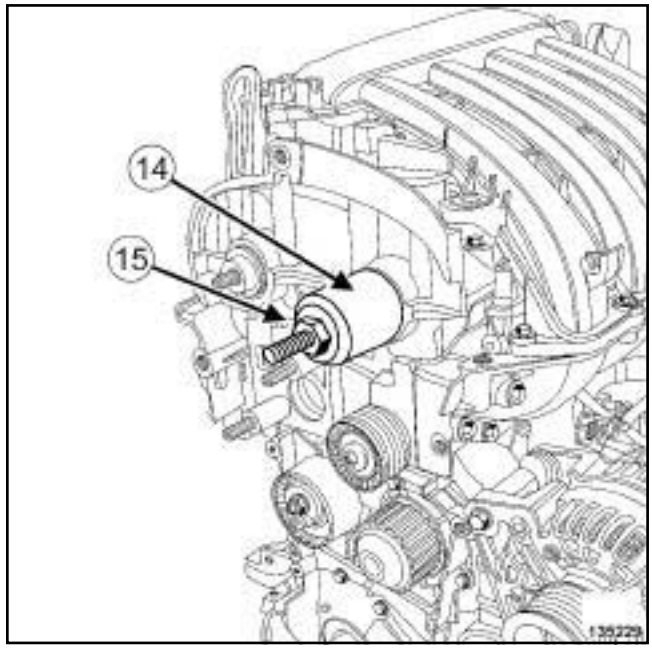
105531



135231

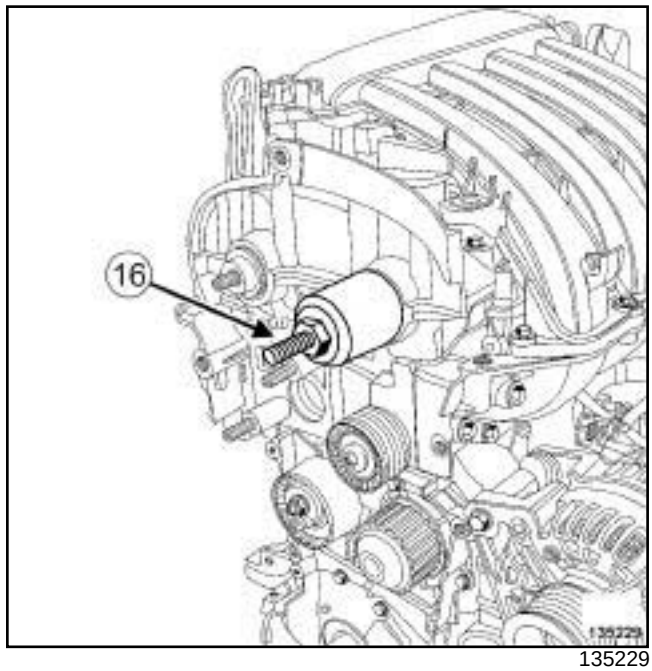
❑ Fit the protector fitted with a new seal (**13**) on the inlet and exhaust camshaft, taking care not to touch the seal.

❑ Screw on the stud (**12**) of the toolon the inlet and exhaust camshafts.



135229

❑ Fit the cover (**14**) and the collar nut (**15**) of the.



135229

❑ Screw on the collar nut until the cover touches the cylinder head.

❑ Remove:

- the nut,
- the cover,
- the threaded rod (**16**) .

K4M

III - FINAL OPERATION

❑ Refit:

- the inlet camshaft pulley with a new nut,
- the exhaust camshaft pulley with a new nut.

❑ Fit the locking toolon the camshaft pulleys.

❑ Torque tighten:

- the **inlet camshaft hub nut (30 N.m + 84° ± 4°)**,
- the **exhaust camshaft hub nut (30 N.m + 84° ± 4°)**.

❑ Remove the locking tool.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Special tooling required	
Mot. 1430	Set of 5 crankshaft and camshaft pulley timing pins.

Tightening torques ▽	
camshaft stud	**12 N.m**
camshaft pulley nut	**30 N.m + 86° ± 6°.**

REMOVAL

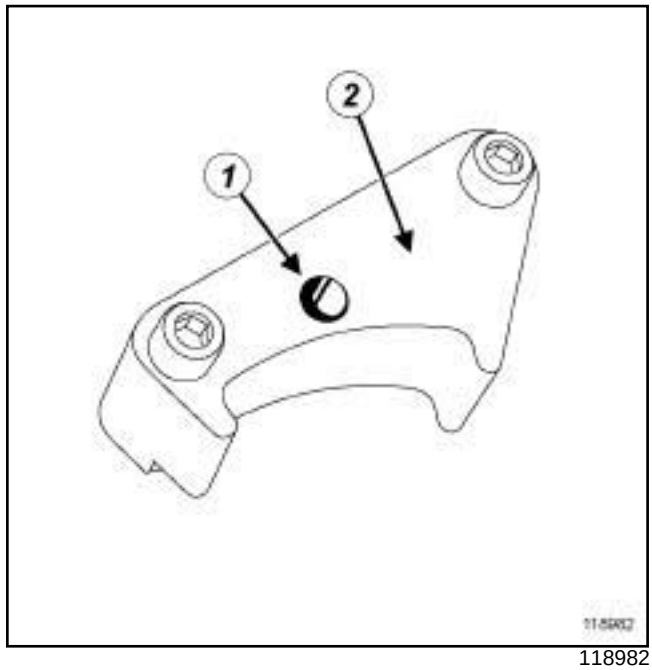
I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.

❏ Remove:

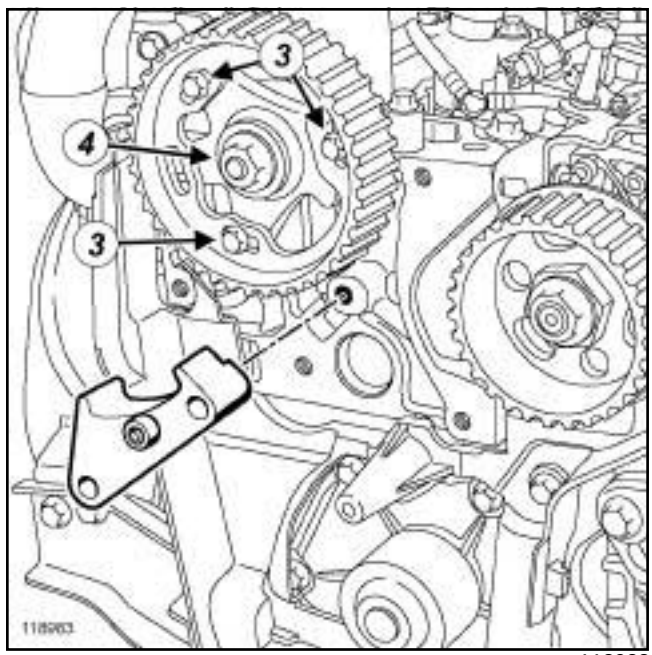
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the engine undertray bolts,
- the engine undertray,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the crankshaft accessories pulley (see **11A**, **Top and front of engine**, **Crankshaft accessories pulley: Removal - Refitting**, page **11A-10**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the **(Mot. 1430)**.

II - REMOVAL OPERATION



118982

❏ Increase the hole (**1**) of the (**2**) using an **8.5 mm** drill bit.



118983

❏ Undo the camshaft pulley hub bolts (**3**) .

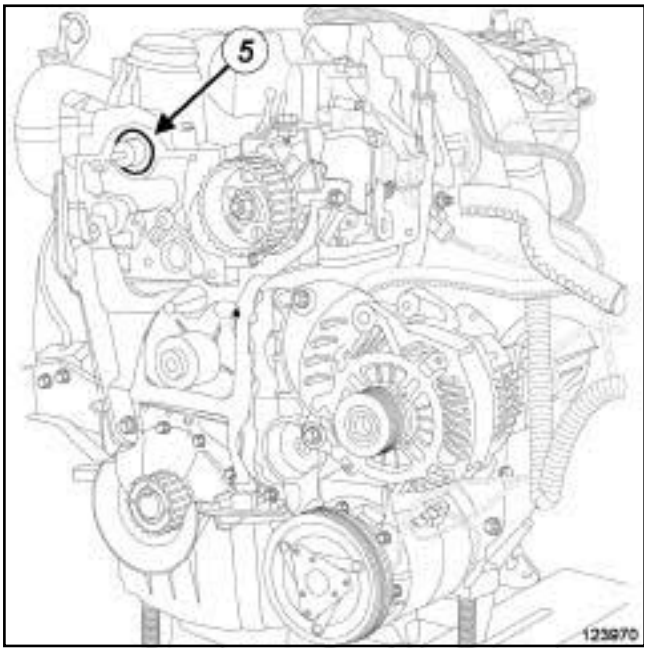
❏ Fit theon the cylinder head to lock the camshaft pulley wheel.

❏ Tighten the camshaft pulley hub bolts (**3**) .

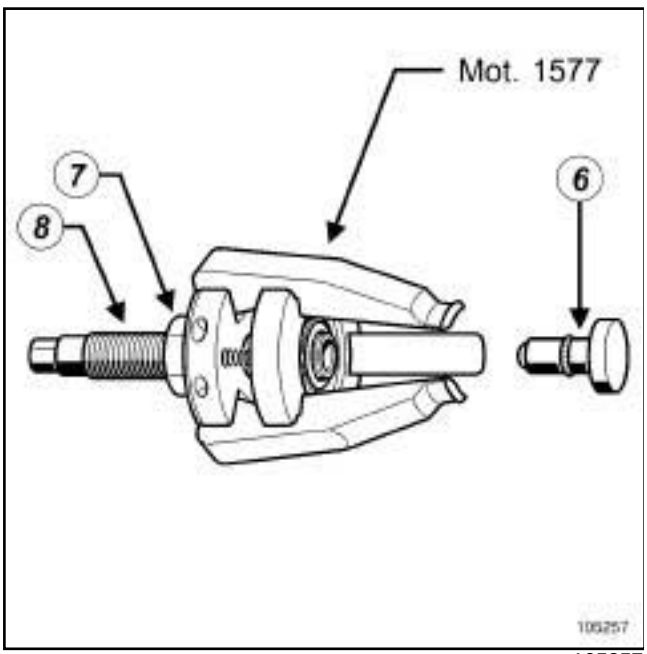
❏ Remove:

- the nut (**4**) from the camshaft pulley,
- the,

- the camshaft pulley.



123970



105257

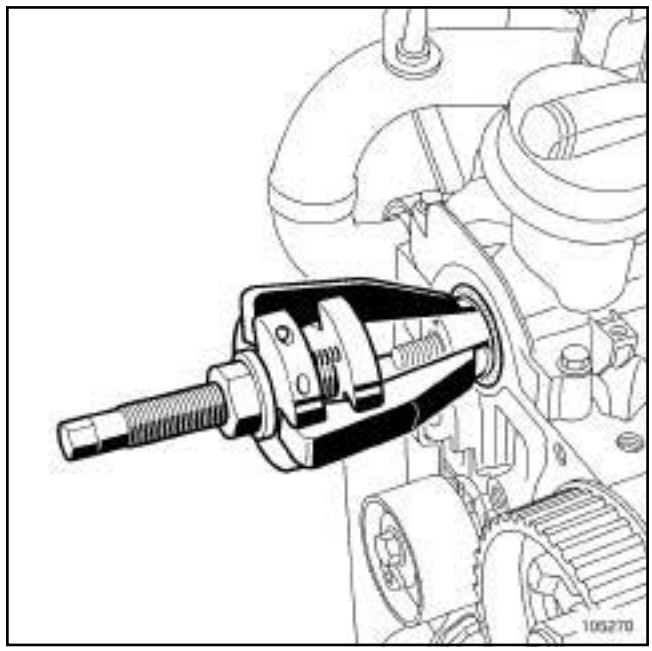
❑

Note:

The camshaft seal is removed using the.

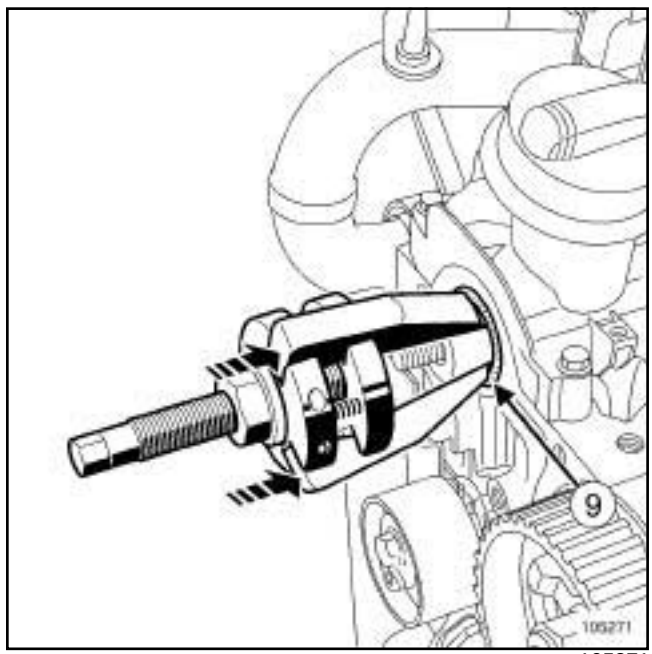
❑ Remove the camshaft seal (**5**) making sure that the end piece (**6**) of the toolis always removed.

❑ Loosen bolts (**7**) and (**8**) fully from the.



105270

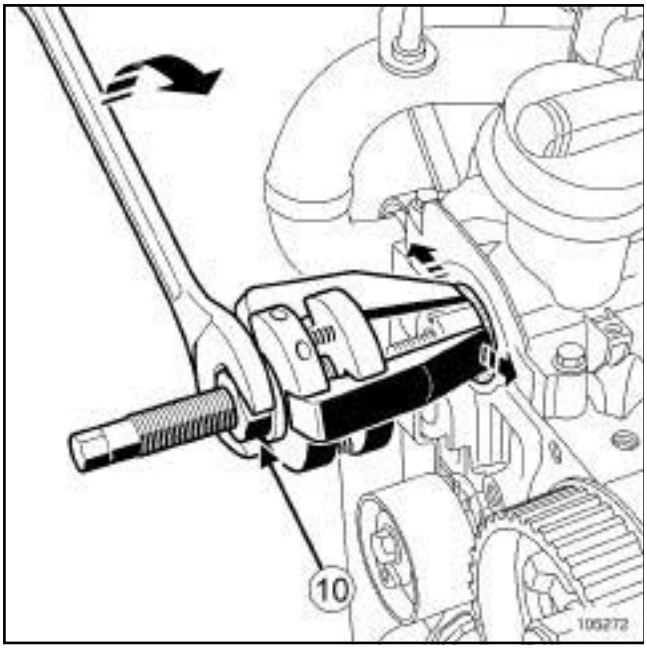
❑ Position the claws of theon the camshaft.



105271

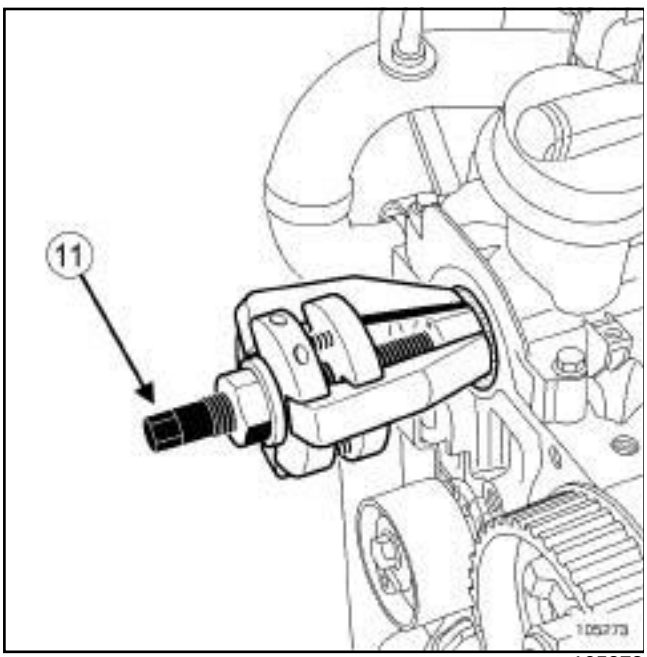
❑ Push the tooluntil contact is made between the ends (**9**) of the claws and the camshaft seal.

K9K



105272

❑ Separate the claws by turning the bolt (**10**) clockwise using an open-jawed spanner.



105273

❑ Remove the camshaft seal by turning the bolt (**11**) clockwise.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the camshaft seal housing in the cylinder head,
- the camshaft seal mating face on the camshaft.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

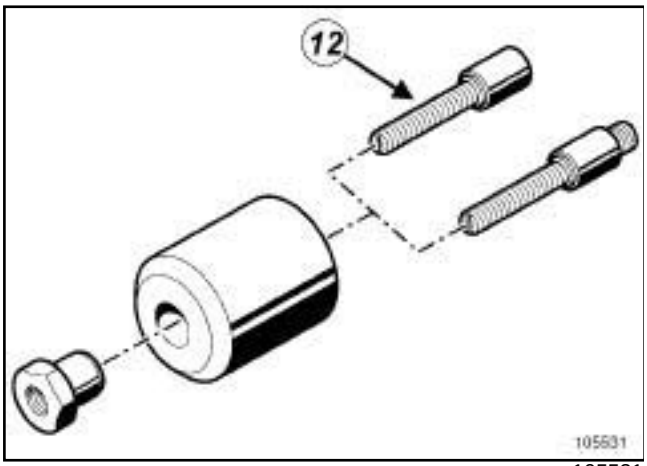
❑ **parts always to be replaced: Camshaft seal on timing end**.

❑ **parts always to be replaced: camshaft timing sprocket nut**.

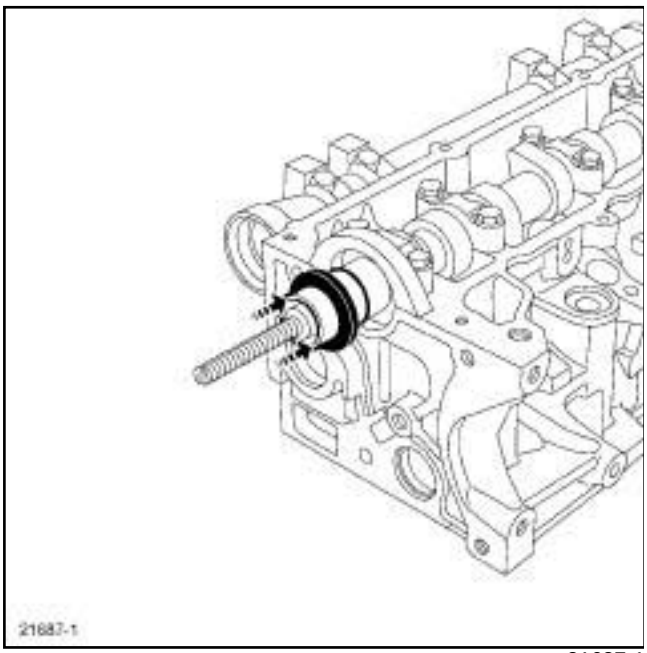
❑ **parts always to be replaced: camshaft timing sprocket stud (if loosened)**.

K9K

II - REFITTING OPERATION FOR PART CONCERNED



105531



21687-1

❏ Screw the stud (**12**) of theonto the camshaft.

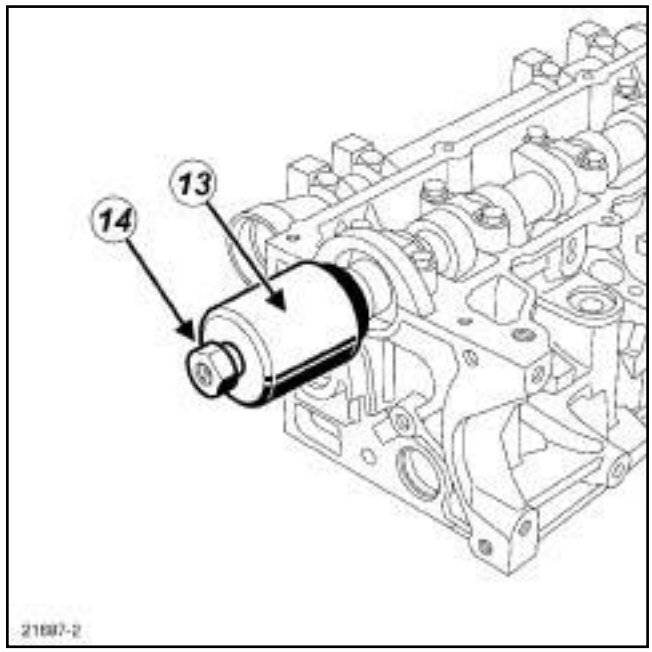
❏ Fit a new camshaft seal on the camshaft.

Note:

For camshaft seals delivered fitted to a protective sleeve:

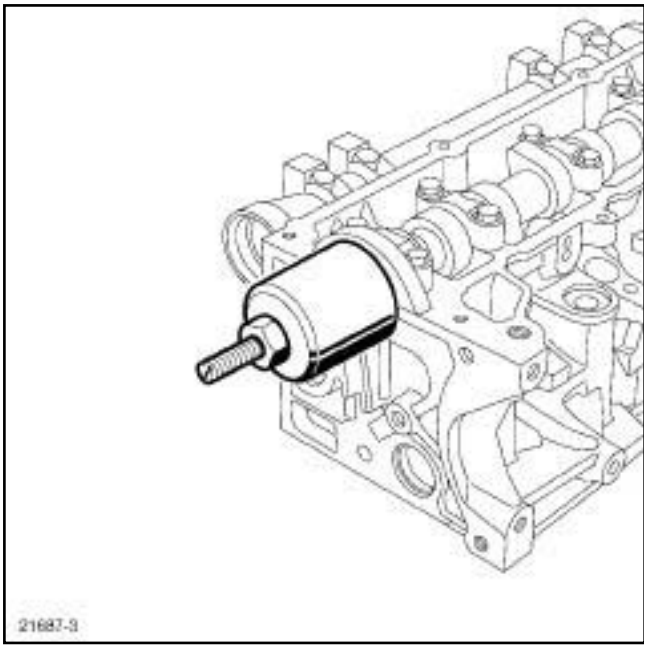
- do not remove the camshaft seal from its protective sleeve,
- fit the sleeve fitted with the camshaft seal to the camshaft,
- push the protective sleeve towards the cylinder head until the camshaft seal reaches its limit on the cylinder head,
- fit the seal on the camshaft by following the recommendations below.

1 - First fitting of the camshaft seal



21687-2

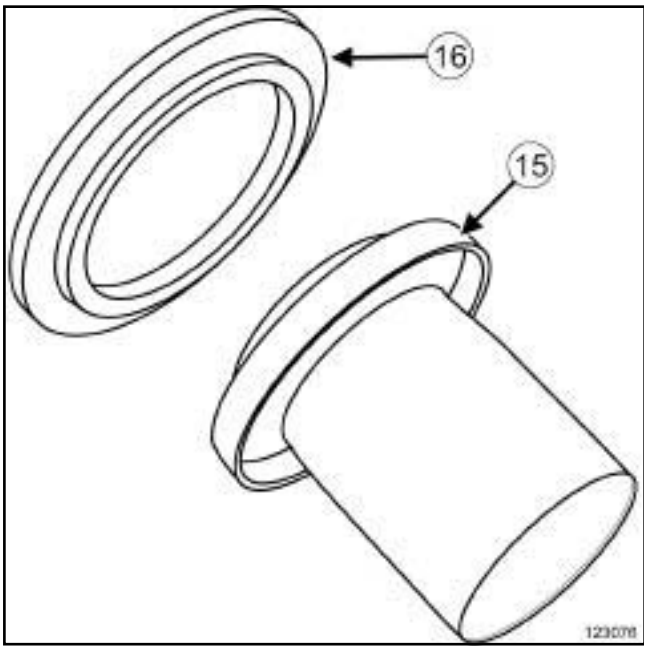
❏ Fit the cover (**13**) and the collar nut (**14**) of the.



21687-3

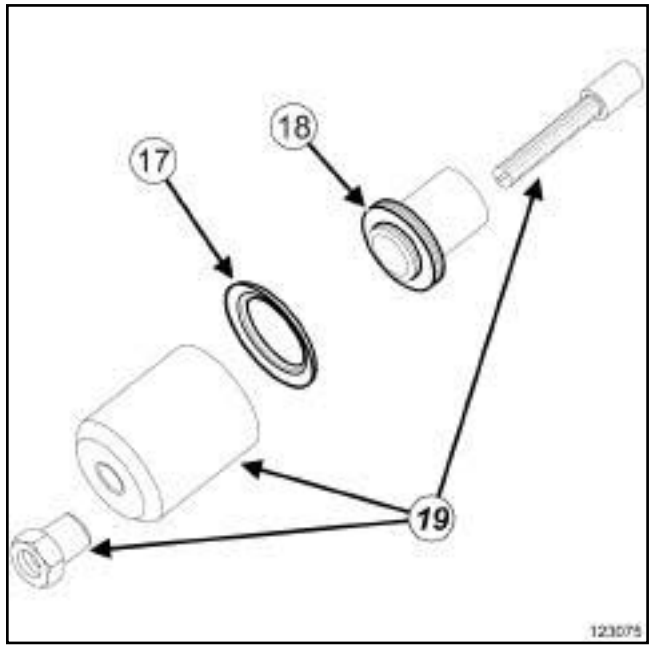
❏ Screw on the collar nut until the cover touches the cylinder head.

2 - Second fitting of the camshaft seal



123076

❏ Depending on the case, the Parts Department delivers seals (**15**) equipped with a spacer (**16**) amongst other things.



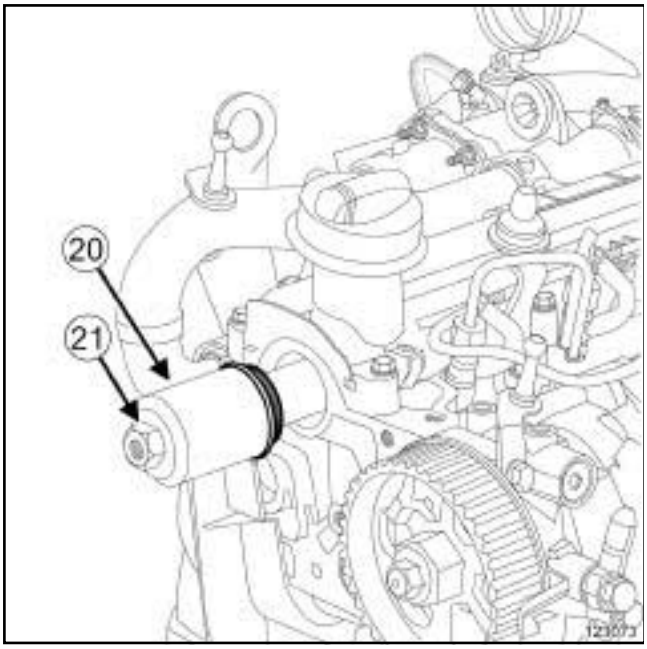
123075

❏

Note:

The spacer (**17**) is used to fit the seal (**18**) and is used in addition to the tool (**19**) .

K9K

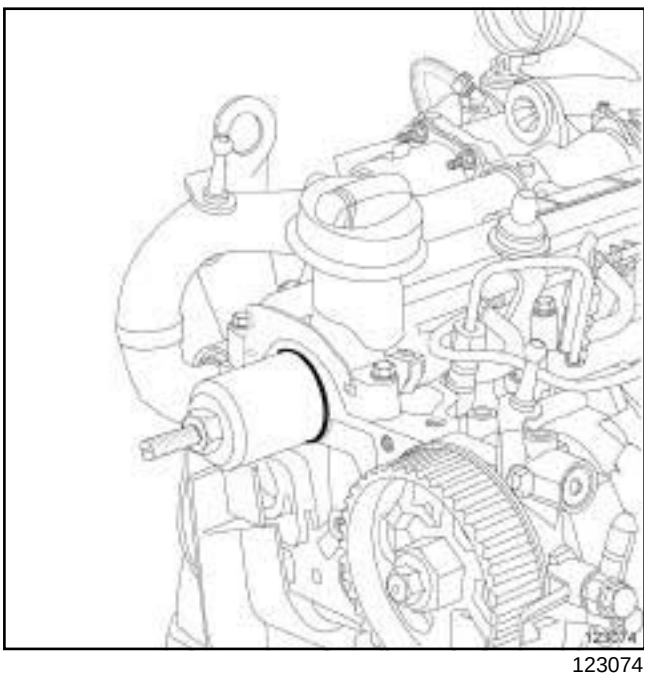


123073

❑ Position the bell (**20**) fitted with the spacer on the camshaft seal side and then position the collared nut (**21**) of the tool.

Note:

The spacer fits on the bell of the toolso that the internal edge of the spacer is on the side of the camshaft seal.



123074

❑ Screw on the collar nut until the spacer fitted on the cover touches the cylinder head.

3 - Continued for both methods

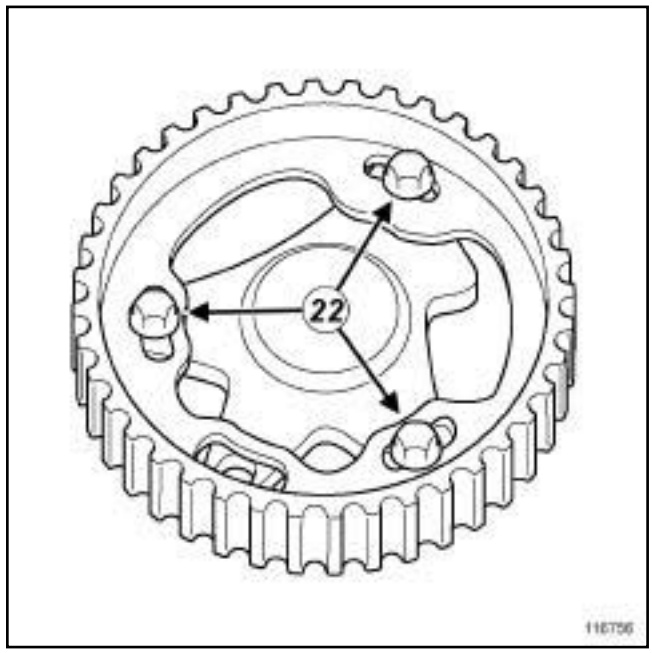
❑ Remove:

- the collar nut from the,
- the cover from the,
- the stud of the,
- the protective sleeve and the spacer, if fitted then throw them away.

❑ Torque tighten the **camshaft stud (12 N.m)**

❑ Refit:

- the camshaft pulley,
- a new camshaft pulley nut.



116756

❑ Undo the camshaft pulley hub bolts (**22**) .

❑ Fit theon the cylinder head to lock the camshaft pulley wheel.

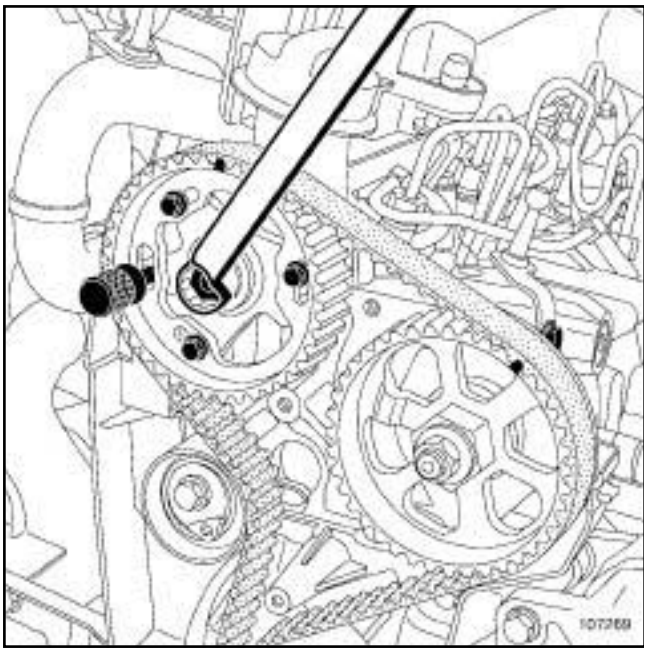
❑ Tighten:

- the camshaft pulley hub bolts,
- to torque and angle the **camshaft pulley nut (30 N.m + 86° ± 6°.)**

❑ Remove the tool.

K9K

III - FINAL OPERATION



107269

❏ Set the camshaft pulley hub using the tool **(Mot. 1430)**.

> Note:
>
> If the pin **(Mot. 1430)** does not engage, tum the camshaft pulley hub using an **18 mm** offset wrench to facilitate the setting of the camshaft pulley hub.

❏ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) .
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the engine undertray,
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal - Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Refit the engine cover.

K4M

Tightening torques ▽	
new oil separator bolts	**15 N.m**

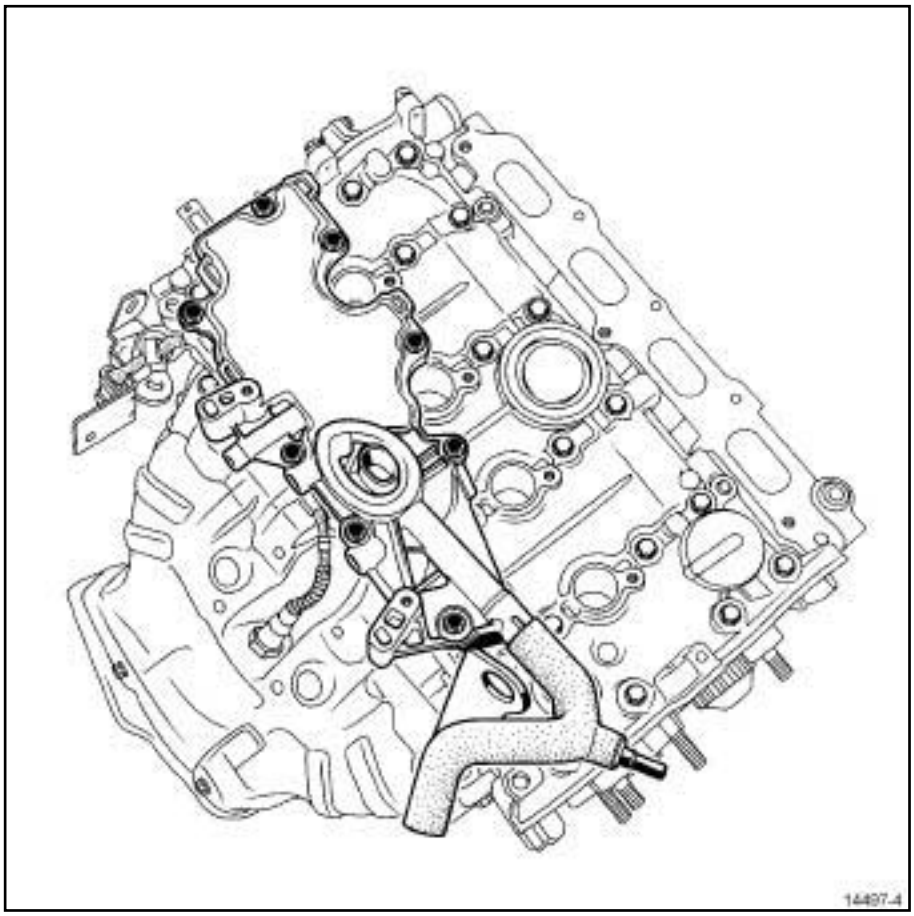
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove:

- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) .

II - REMOVAL OPERATION



14497-4

❑ Remove:

- the oil decanter bolts,
- the oil decanter.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: oil decanter bolt**

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
When cleaning parts, it is essential that the parts do not impact on each other, otherwise their mating faces may be damaged and therefore their adjustments may be altered, which could damage the engine.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

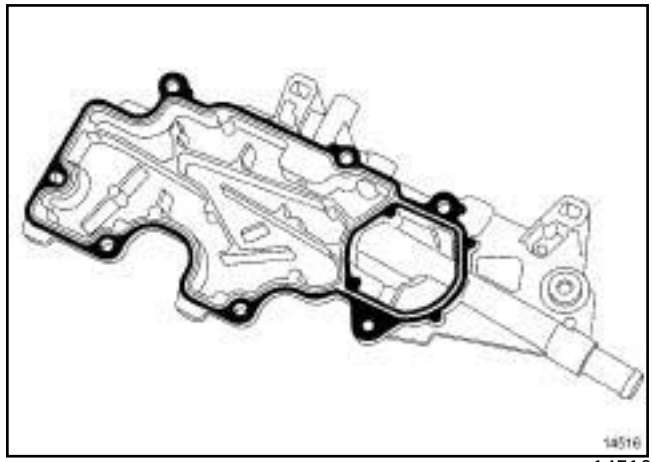
- the oil separator joint face if it is to be re-used,
- the rocker cover joint face.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease:

- the oil separator joint face if it is to be re-used,
- the rocker cover joint face.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

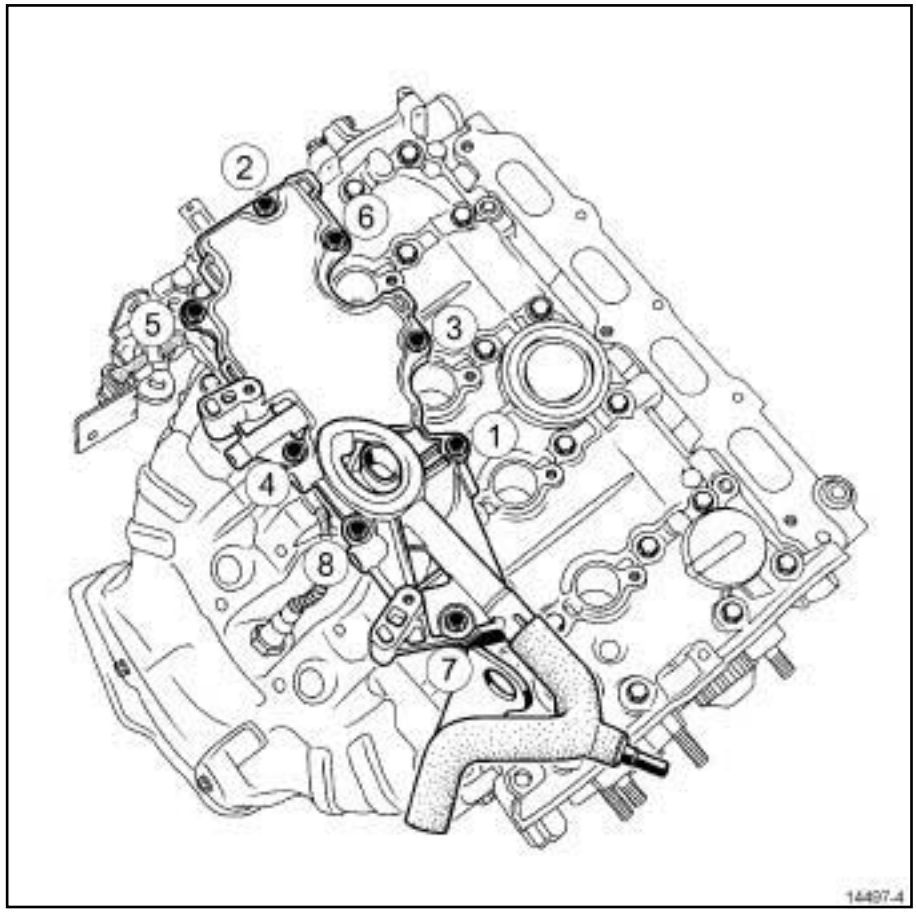

14516

❑ Apply **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) using a stipple roller on the joint face of the oil separator until the joint face is completely coated.

II - REFITTING OPERATION

❑ Refit the oil separator.

K4M



14497-4

❑ Torque tighten in order the **new oil separator bolts (15 N.m)**.

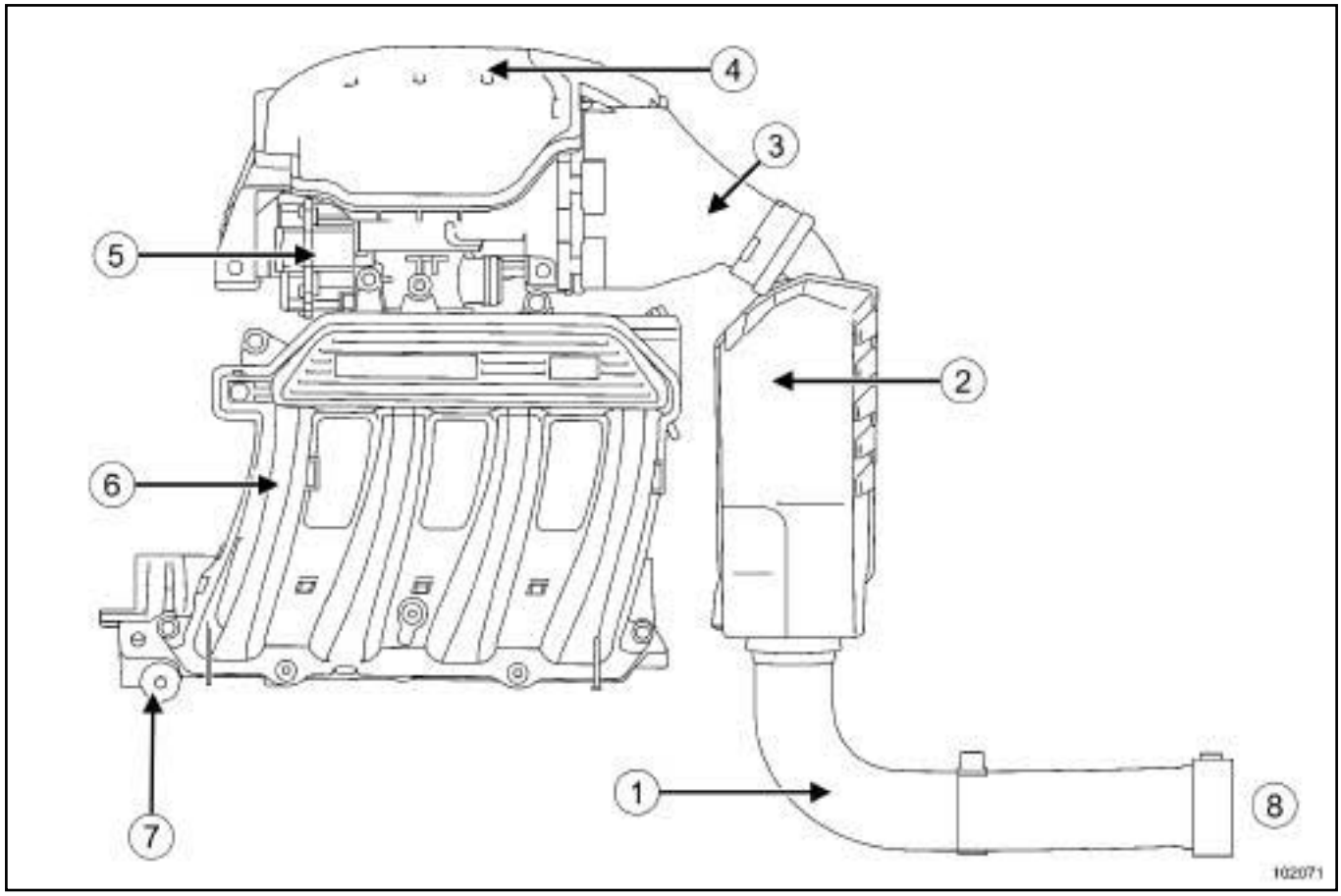
III - FINAL OPERATION

❑ Refit:

- the ignition coils (see **17A**, **Ignition**, **Coils: Removal - Refitting**, page **17A-1**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

K4M

Diagram of the air inlet circuit



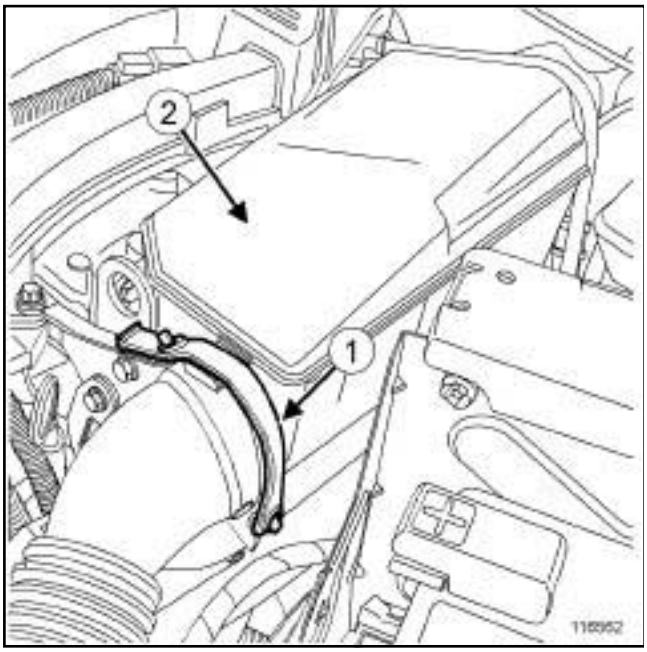
102071

(**1**)	Air inlet trunking
(**2**)	Air resonator
(**3**)	Air filter unit
(**4**)	Air filter
(**5**)	Throttle valve
(**6**)	Inlet manifold
(**7**)	Injector holder shim
(**8**)	Air inlet

K4M

REMOVAL

REMOVAL OPERATION FOR PART CONCERNED



116562

❑ Remove:

- the elastic mounting (**1**) from the air resonator unit,
- the air resonator unit (**2**) .

REFITTING

REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the air resonator unit,
- the air resonator elastic mounting.

K4M

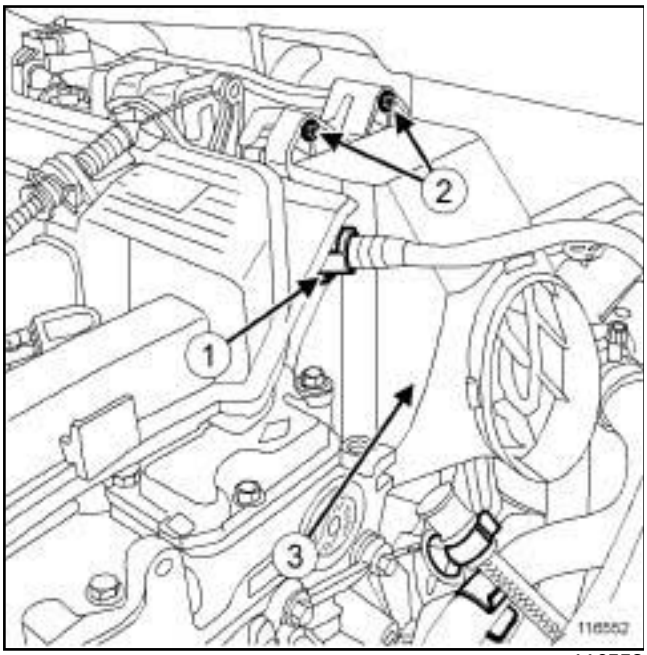
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

❑ Disconnect the brake servo vacuum pipe ***(1)*** from the inlet distributor.

II - REMOVAL OPERATION



116552

❑

WARNING
Do not damage the vacuum outlet on the inlet distributor. If it is damaged, the inlet distributor will need to be replaced.

❑ Remove:

- the two bolts (**2**) from the air filter cover,
- the air filter cover (**3**) ,
- the air filter.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter housing.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- the air filter,
- the air filter cover,
- the two air filter cover bolts.

III - FINAL OPERATION

❑ Reconnect the brake servo vacuum pipe to the inlet distributor.

❑ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

K9K

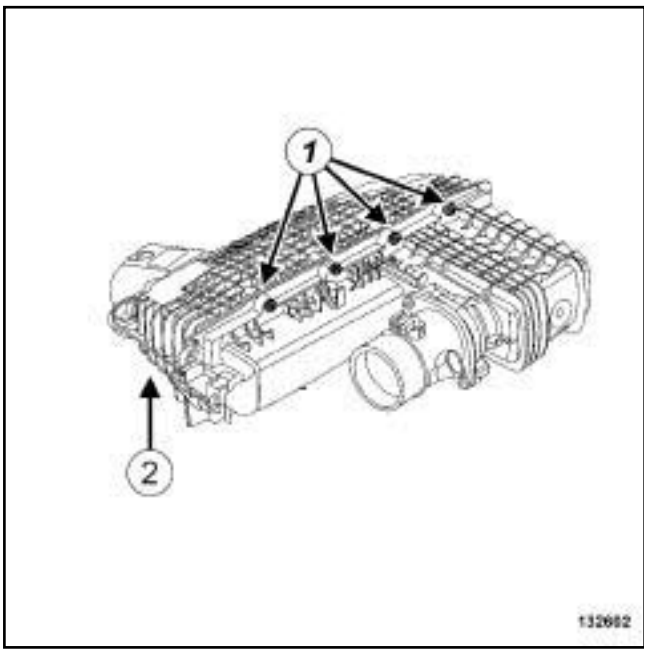
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - First fitting of air filter unit



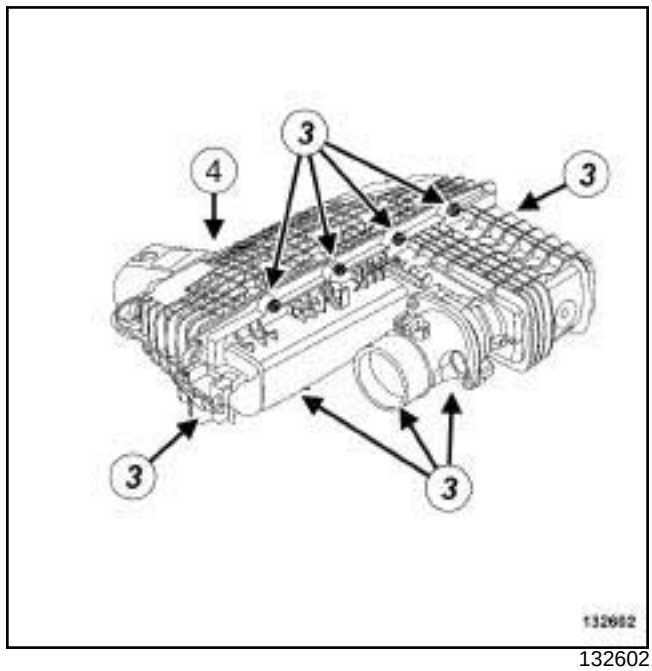
132602

❑ Remove the 4 bolts (**1**) from the air filter unit.

❑ Pivot the hinged cover (**2**) of the air filter unit in relation to the air filter unit tank.

❑ Move aside the air filter unit cover (**2**) .

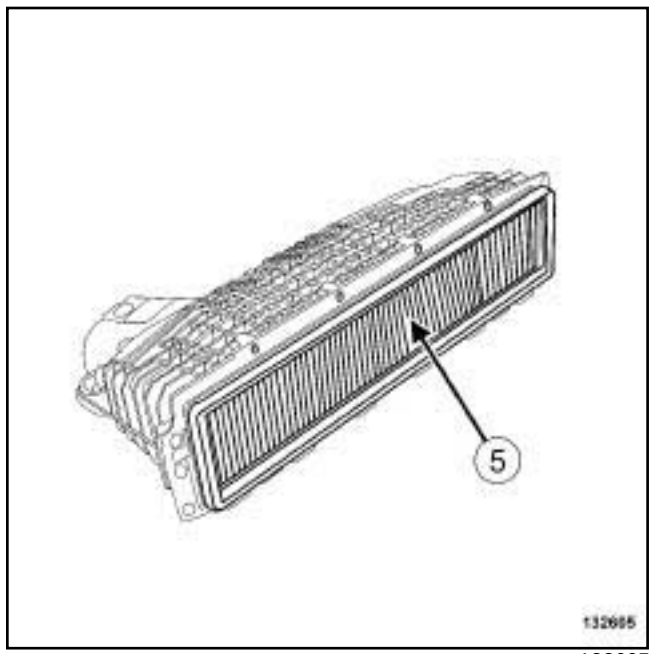
2 - Second fitting of air filter unit



132602

❑ Remove the 9 bolts (**3**) from the air filter unit.

❑ Move aside the air filter unit cover (**4**) .



132605

❑ Remove the air filter (**5**) from the air filter unit cover.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Clean the air filter unit.

K9K

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the air filter in the air filter unit cover.

> **WARNING**
> If the air filter is fitted incorrectly in the air filter unit, unfiltered air may enter the engine and cause the engine to malfunction.

❏ Fit the air filter unit cover.

III - FINAL OPERATION

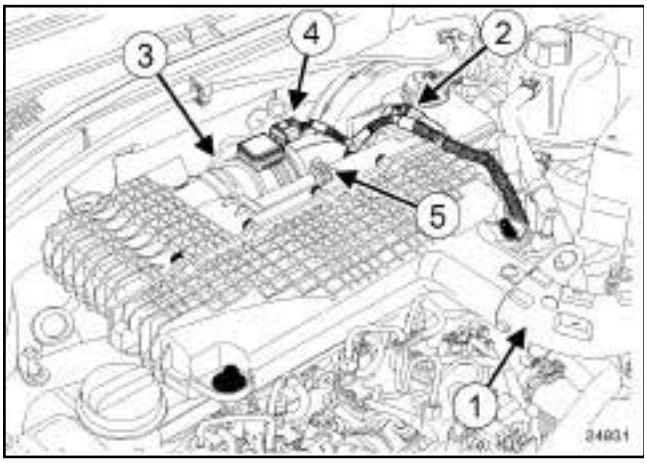
❏ Refit the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the engine cover.



24831

❏ Disconnect:

- the air intake sleeve (**1**) on the air filter unit,
- the air pressure sensor connector (**2**) from the air filter unit.

❏ Disconnect the connector from the air flowmeter (**4**) .

❏ Disconnect the air inlet duct (**5**) from the air filter unit.

❏ Move aside the air filter unit wiring harness.

II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Lift up the front section of the air filter unit.

❏ Slide the air filter unit to the left.

❏ Remove:

- the bolt of the turbocharger pressure sensor,
- the turbocharger pressure sensor on the air filter unit.

❏ Remove the air filter unit.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Check that there are mounting studs for the air filter unit on the EGR mounting and on the brackets.

Note:

Replace the studs if necessary.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Fit the air filter unit sideways against the EGR valve mounting.

❏ Slide the air filter unit to the right.

❏ Refit:

- the turbocharger pressure sensor on the air filter unit.
- the bolt of the turbocharger pressure sensor,

❏ Refit the air filter unit by lowering it vertically from the injection end.

III - FINAL OPERATION

❏ Connect the air inlet duct to the air filter unit.

❏ Connect the air flowmeter connector.

❏ Connect:

- the turbocharging pressure sensor connector,
- the air intake sleeve on the air filter unit.

❏ Refit the engine cover.

K4M

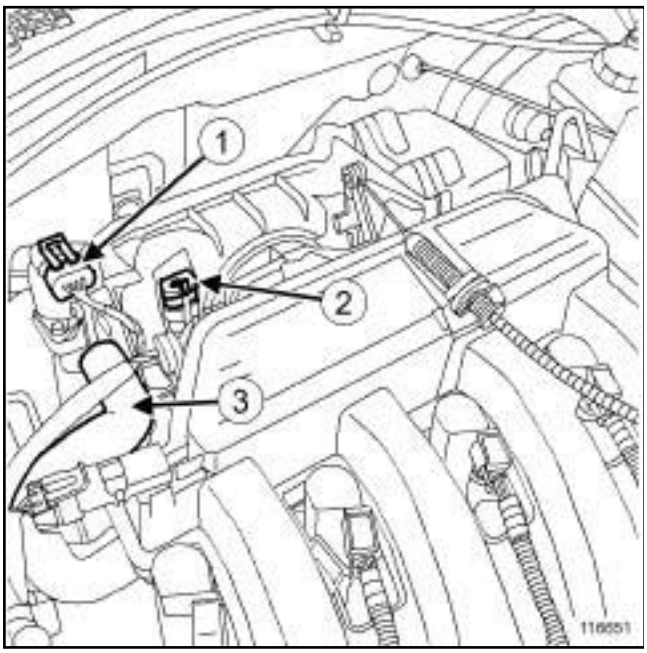
Tightening torques ▽	
air filter unit bolts	**9 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

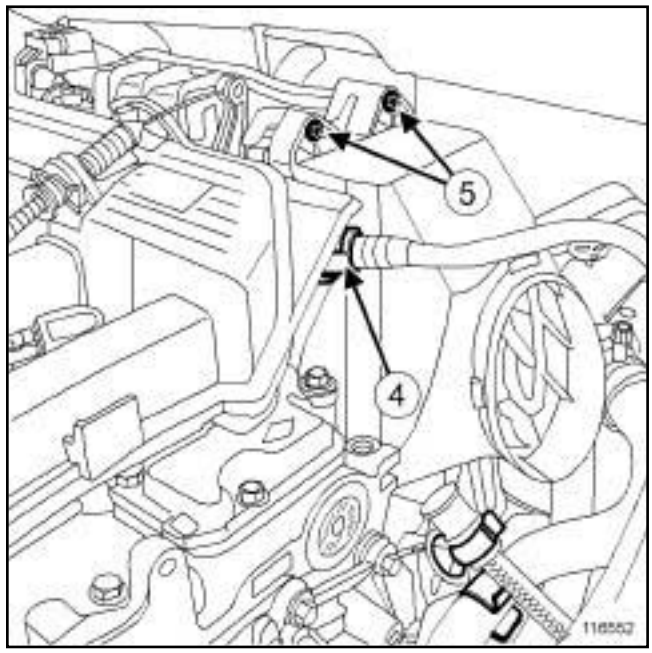


116651

❏ Disconnect:

- the idle speed regulation stepping motor connector (**1**) ,
- the connector (**2**) from the throttle position potentiometer,
- the petrol vapour recirculation pipe (**3**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



116552

❏ Disconnect the vacuum pipe (**4**) from the brake servo on the inlet distributor

❏ Remove:

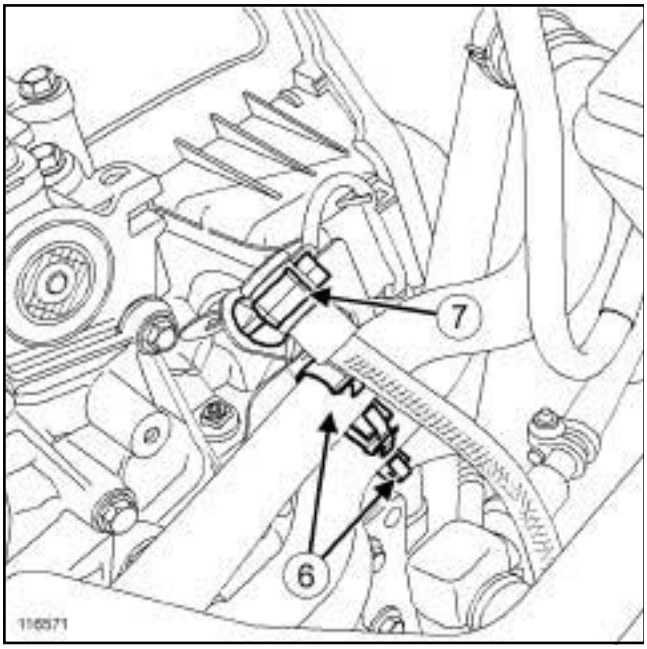
- the two bolts (**5**) from the air filter cover,
- the filter element.

❏

WARNING

Do not damage the vacuum outlet on the inlet distributor. If it is damaged, the inlet distributor will have to be replaced.

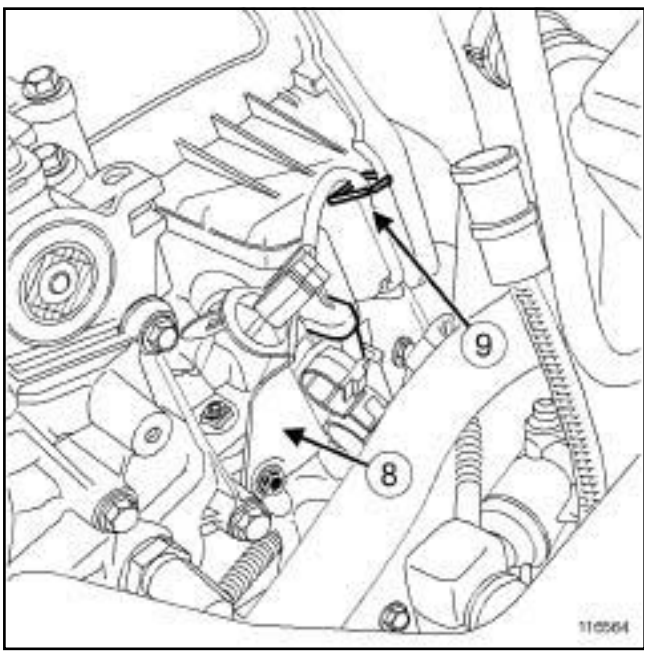
K4M



116571

❏ Unclip:

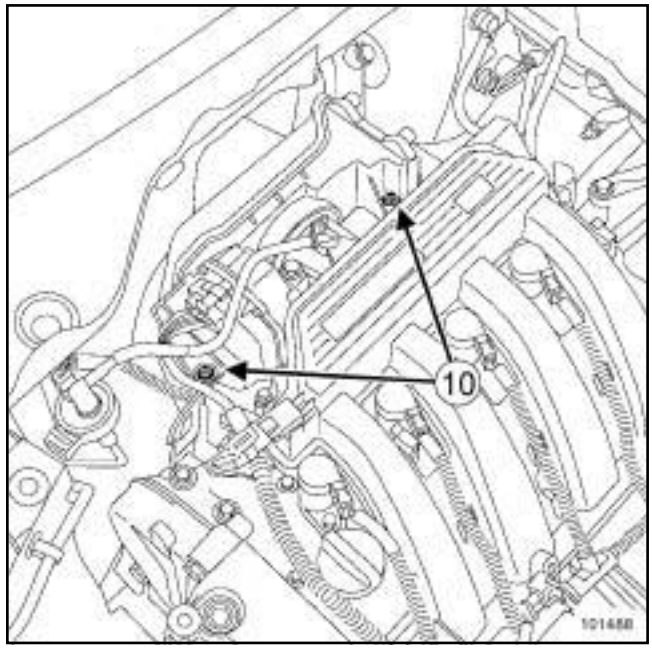
- the coolant pipes at (**6**) ,
- the breather (**7**) .



116564

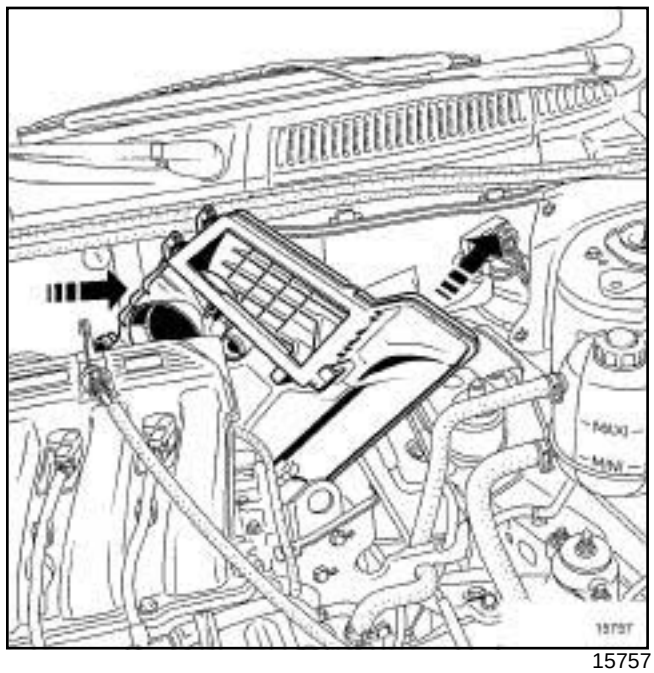
❏ Remove the coolant pipes mounting bracket (**8**) .

❏ Unpick the electrical wiring (**9**) from the oxygen sensor.



101488

❏ Remove the two bolts (**10**) from the air filter unit.



15757

❏ Remove the air filter unit.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Replace:

- the throttle valve seal each time it is removed using grease to make fitting easier,

- the plastic rivets and clips every time they are removed.

II - REFITTING OPERATION

❏ Refit:

- the air filter unit,
- the two air filter unit bolts.

❏ Torque tighten the **air filter unit bolts (9 N.m)**.

❏ Attach the electrical wiring to the oxygen sensor.

❏ Refit the coolant pipes mounting bracket.

❏ Reclip:

- the breather,
- the coolant pipes.

❏ Refit:

- the filter element,
- the two air filter cover bolts.

❏ Reconnect:

- the brake servo vacuum pipe on the inlet distributor,
- the petrol vapour recirculation pipe,
- the throttle position potentiometer connector,
- the idle speed regulation stepping motor connector.

III - FINAL OPERATION

❏ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

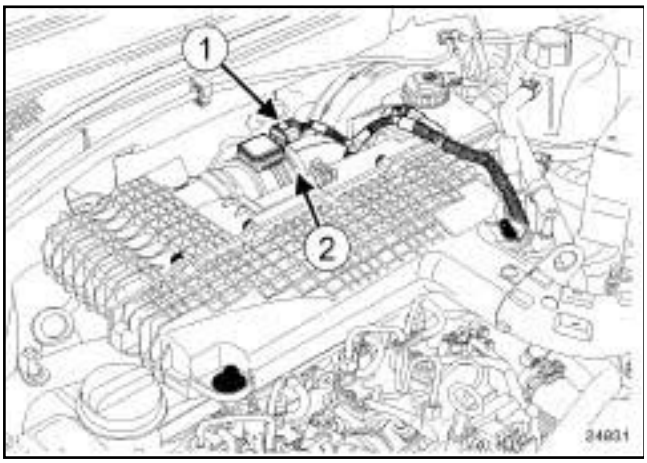
❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 796

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the engine cover.



24831

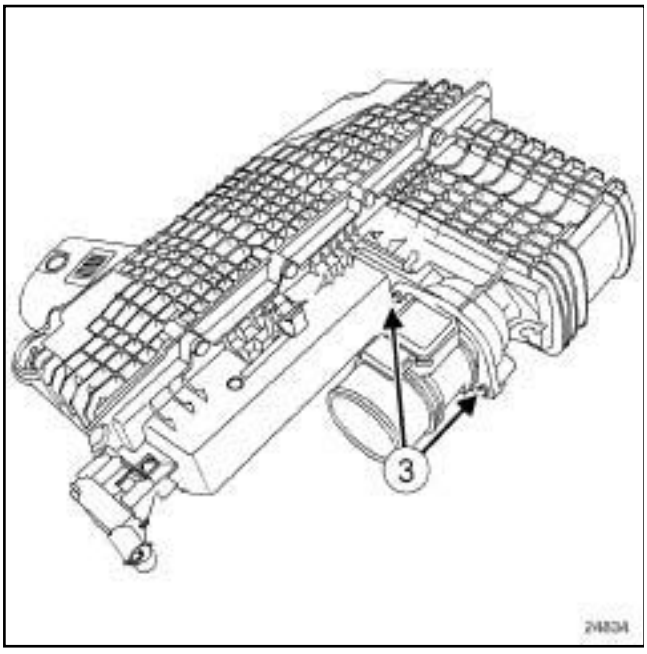
❏ Disconnect the air flowmeter connector (**1**) .

❏ Undo the clip (**2**) from the air flowmeter outlet duct.

❏ Remove the air flowmeter outlet air duct.

❏ Remove the air flowmeter outlet air duct.

II - REMOVAL OPERATION FOR PART CONCERNED



24834

❏ Remove:

- the air flowmeter (**3**) bolts on the air filter box,
- the air flowmeter,
- the air flowmeter seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the air flowmeter seal on the air filter unit.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- a new air flowmeter seal on the air filter box,
- the air flowmeter,
- the air flowmeter bolts.

III - FINAL OPERATION

❏ Refit:

- the air flowmeter outlet air duct,
- the air flowmeter outlet air duct clip.

❏ Connect the air flowmeter connector.

❏ Refit the engine cover.

K4M

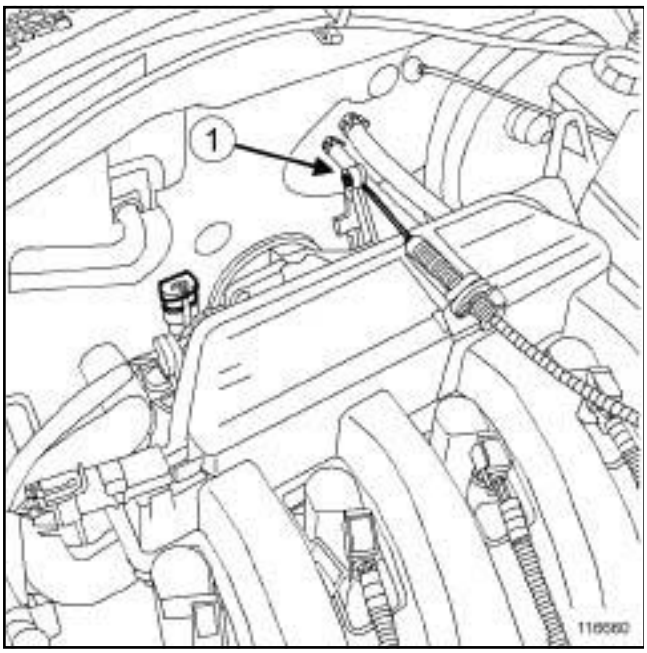
Tightening torques ▽	
throttle valve bolts	**13 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

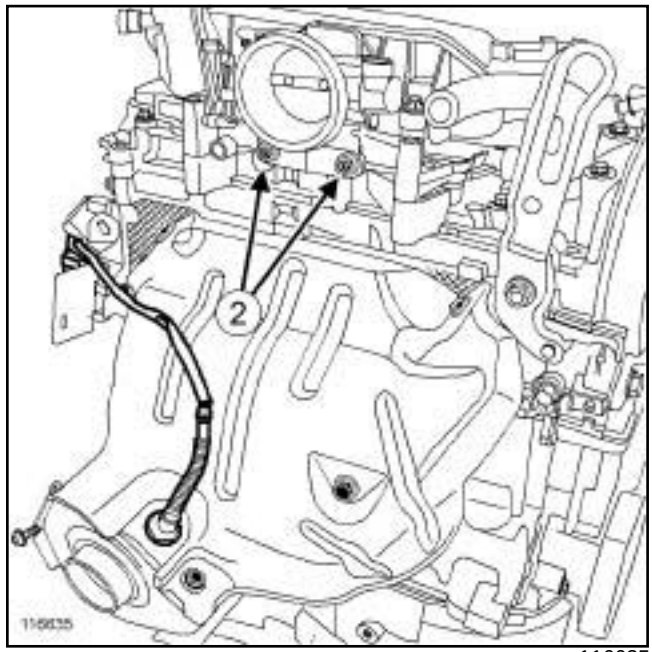
❏ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .



116660

❏ Disconnect the accelerator cable at (**1**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



116635

❏ Remove:

- the throttle valve bolts (**2**) ,
- the throttle valve.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Throttle valve seal**.

II - REFITTING OPERATION

❏ Refit:

- the throttle valve equipped with a new seal,
- the throttle valve bolts.

❏ Torque tighten the **throttle valve bolts (13 N.m)**.

III - FINAL OPERATION

❏ Reattach the accelerator cable.

❏ Refit the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

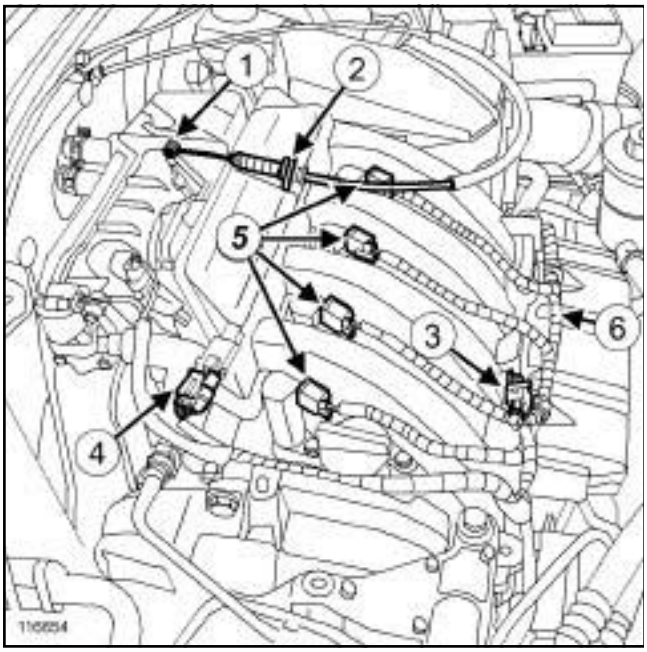
❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
intake distributor mounting bolts	9 N.m

REMOVAL

I - REMOVAL PREPARATION OPERATION



116654

❏ Disconnect the accelerator cable on the throttle valve at (**1**) .

❏ Remove the accelerator cable (**2**) from the inlet distributor.

❏ Disconnect:

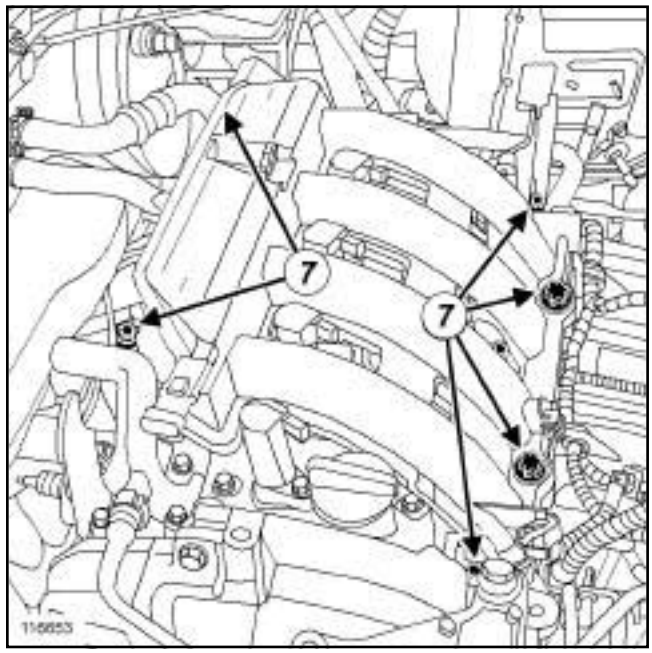
- the air temperature sensor connector (**3**) ,
- the air inlet pressure sensor connector (**4**) ,
- the connectors (**5**) from the coils.

❏ Unclip the wiring (**6**) on the inlet distributor.

❏ Move the wiring aside.

❏ Remove the throttle valve (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



116653

❏ Remove:

- the inlet distributor bolts (**7**) ,
- the inlet distributor.

❏ When replacing the inlet distributor, remove:

- the air temperature sensor,
- the inlet air pressure sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: inlet distributor seal**.

K4M

❏

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the housing of each inlet distributor seal if reused,
- the joint face of the injector holder shim.

❏ Fit new seals to the inlet distributor.

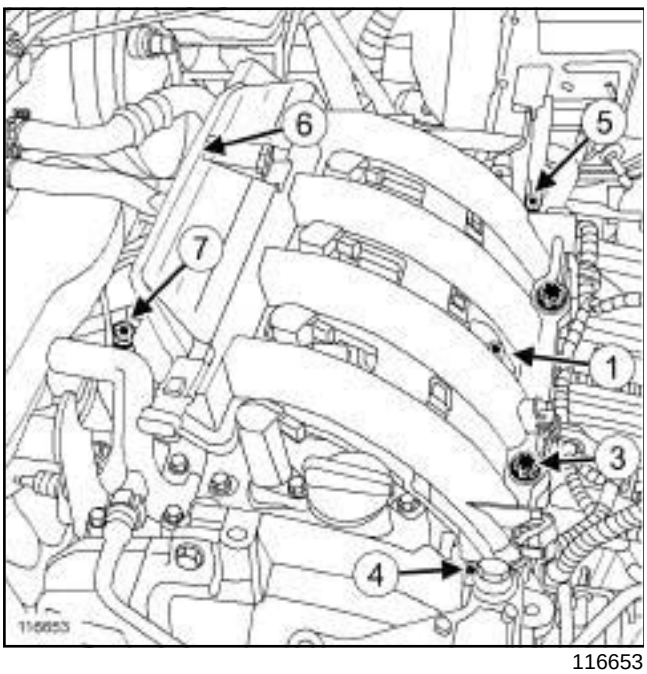
❏ When replacing the inlet distributor, refit:

- the air temperature sensor,
- the inlet distributor pressure sensor.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the inlet distributor,
- the inlet distributor mounting bolts.



116653

❏ Torque tighten in order the **intake distributor mounting bolts (9 N.m)**.

III - FINAL OPERATION

❏ Refit the throttle valve equipped with a new seal (see **12A**, **Fuel mixture**, **Throttle valve: Removal - Refitting**, page **12A-11**) .

❏ Clip the wiring onto the inlet distributor.

❏ Connect:

- the coil connectors,
- the air inlet pressure sensor connector,
- the air temperature sensor connector.

❏ Position the accelerator cable on the inlet distributor and on the throttle valve.

K4M

Tightening torques ▽	
injector holder shim bolts (7) and (8)	**25 N.m**
injector holder shim bolts 9 to 16	**21 N.m**
upper timing cover bolt	**41 N.m**
suspended mounting bolt	**62N.m**

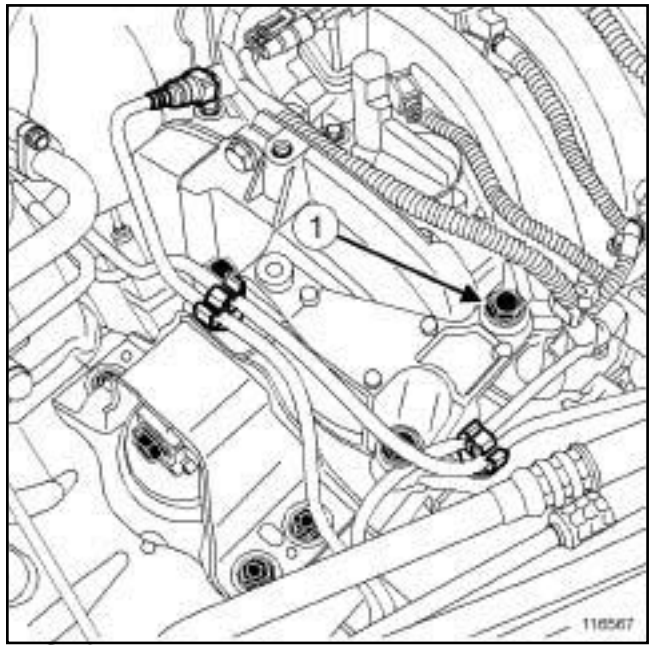
REMOVAL

I - REMOVAL PREPARATION OPERATION

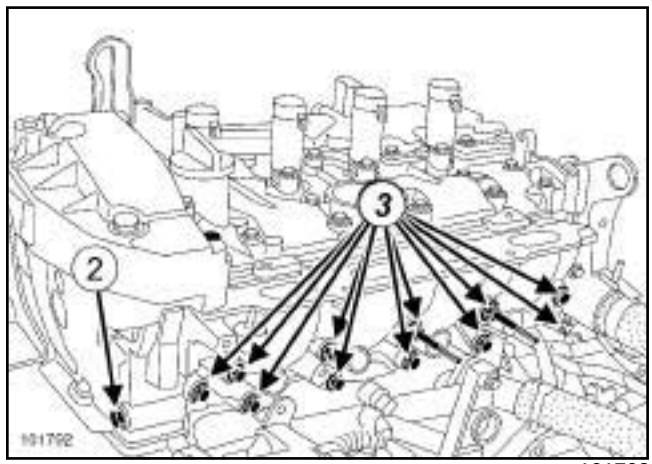
❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) ,
- the injector rail (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-10**) ,
- the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-48**) .



116567



101792

❑ Remove:

- the bolt (**1**) of the suspended mounting on the injector holder shim,
- the bolt (**2**) mounting the upper timing cover on the injector holder shim.

II - REMOVAL OPERATION

❑ Remove:

- the bolts ***(3)*** from the injector holder shim,
- the injector holder shim.

K4M

REFITTING

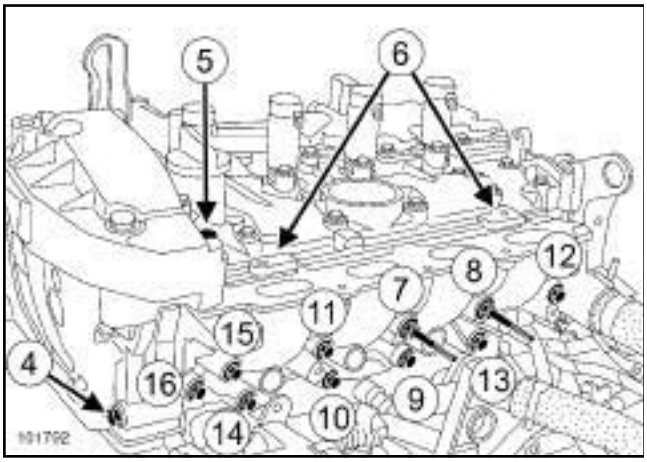
I - REFITTING PREPARATION OPERATION

❏ The injector holder shim seal must always be replaced.

II - REFITTING OPERATION

❏ Fit:

- the injector holder shim,
- all the injector holder shim bolts.



101792

❏ Place the injector holder shim against:

- the upper timing cover by manually tightening the bolt (**4**) ,
- the suspended engine mounting by manually tightening the bolt (**5**) .

❏ Position the injector holder shim against the shims (**6**) on the rocker cover.

❏ Tighten to torque and in order:

- the **injector holder shim bolts (7) and (8) (25 N.m)**,
- the **injector holder shim bolts 9 to 16 (21 N.m)**.

III - FINAL OPERATION

❏ Torque tighten:

- the **upper timing cover bolt (41 N.m)**,
- the **suspended mounting bolt (62N.m)**.

❏ Refit:

- the multifunction support (see **10A**, **Engine and cylinder block assembly**, **Multifunction support: Removal - Refitting**, page **10A-48**) ,
- the injector rail (see **17B**, **Petrol injection**, **Injector rail - Injectors: Removal - Refitting**, page **17B-10**) ,
- the inlet distributor (see **12A**, **Fuel mixture**, **Inlet distributor: Removal - Refitting**, page **12A-12**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Tightening torques ▽	
exhaust manifold stud	**9 N.m**
exhaust manifold nuts	**26 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

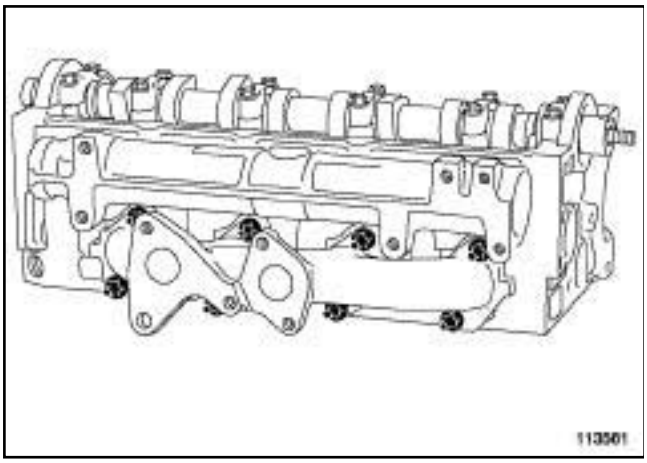
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-9**) ,
- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-1**) .

II - REMOVAL OPERATION



113561

❏ Remove:

- the exhaust manifold nuts,
- the exhaust manifold.

❏ Mark the position of the exhaust manifold gasket.

❏ Remove the exhaust manifold gasket.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: exhaust manifold seal**.

❏ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint face:

- the cylinder head,
- of the exhaust manifold, if it is to be reused.

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and **CLEAN CLOTHS** to clean and degrease the joint faces:

- the cylinder head,
- of the exhaust manifold, if it is to be reused.

Note:

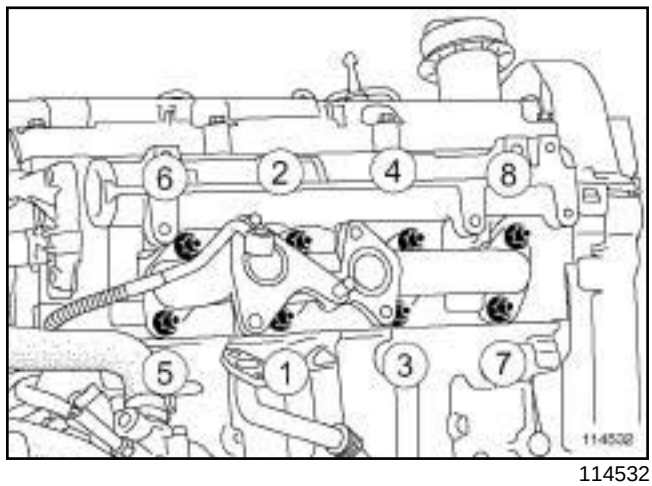
If a stud is loosened during this operation, coat the stud with **HIGH RESISTANCE THREAD LOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❏ Torque tighten the **exhaust manifold stud (9 N.m)**.

II - REFITTING OPERATION

❏ Refit:

- a new exhaust manifold gasket in the position marked during removal,
- the exhaust manifold.



114532

❏ Torque tighten in order the **exhaust manifold nuts (26 N.m)**.

K9K

III - FINAL OPERATION

❑ Refit:

- the turbocharger (see **12B**, **Turbocharging**, **Turbocharger: Removal - Refitting**, page **12B-1**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-9**) ,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) ,
- the engine undertray,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
exhaust manifold studs	**8 N.m**
exhaust manifold mounting nuts	**23 N.m**
bolts (6) mounting the stay on the cylinder block	**21 N.m**
nut (7) mounting the stay on the exhaust manifold	**21 N.m**
exhaust manifold upper heat shield mounting bolts	**12 N.m**
upstream oxygen sensor	**45 N.m**
exhaust bracket mounting bolts	**21 N.m**

REMOVAL

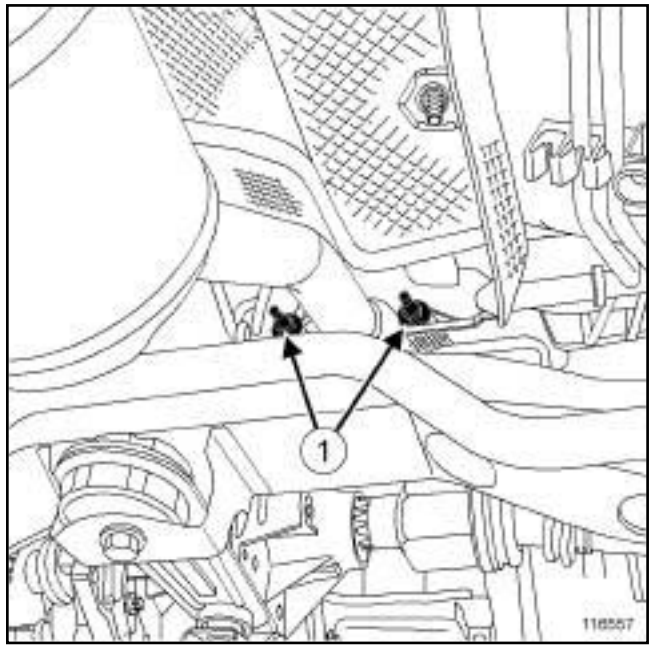
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

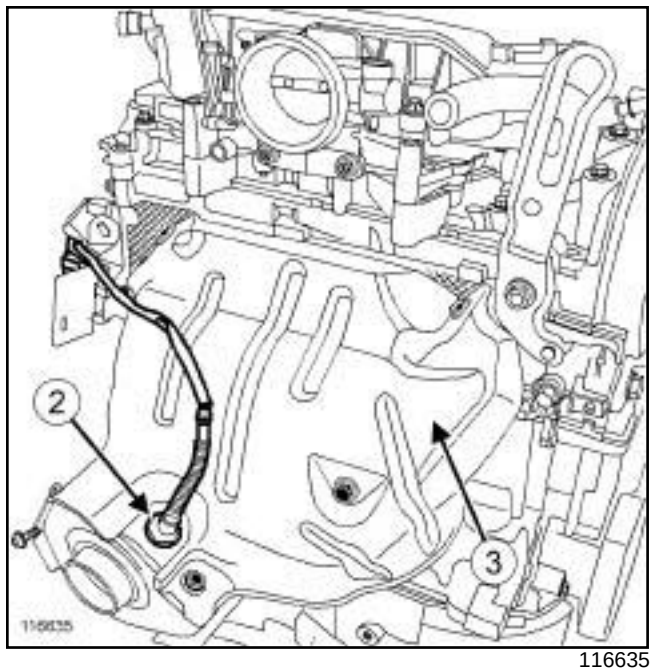
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .



116557

❏ Remove the nuts (**1**) from the exhaust flange.

❏ Push the exhaust pipe towards the rear of the vehicle.



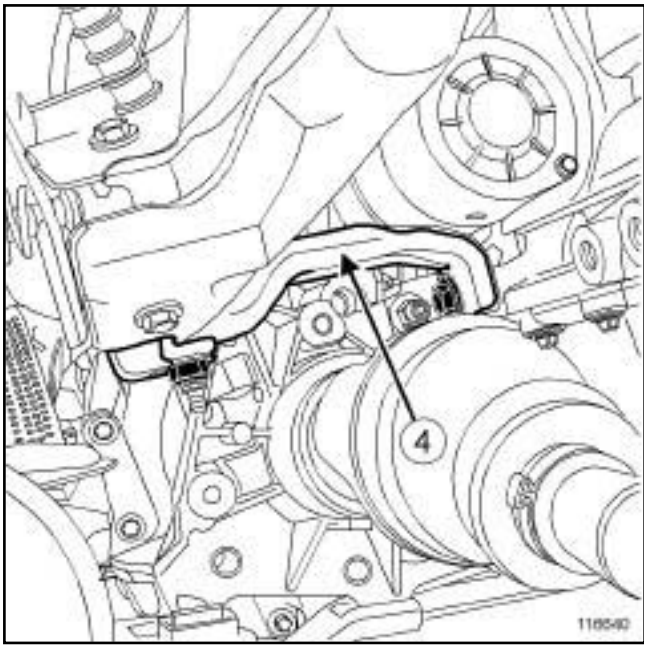
116635

❏ Disconnect the upstream oxygen sensor connector (**2**) .

❏ Remove:

- the upstream oxygen sensor using the,
- the upper heat shield (**3**) from the exhaust manifold.

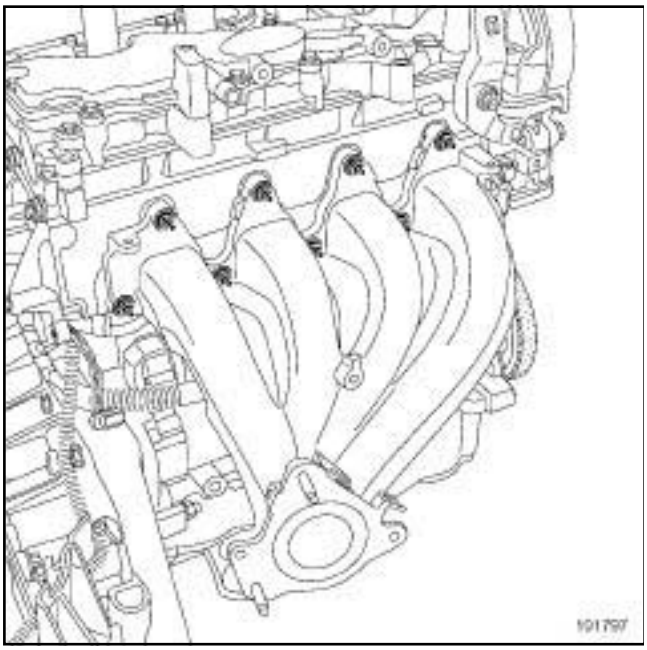
K4M



116640

❑ Remove the stay (**4**) between the exhaust manifold and the cylinder block.

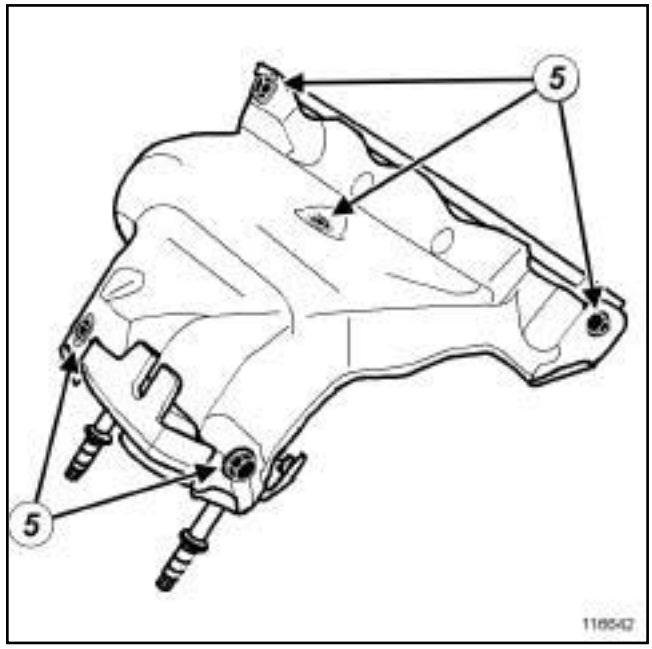
II - REMOVAL OPERATION



101797

❑ Remove:

- the exhaust manifold nuts,
- the exhaust manifold.



116642

❑ Using the workbench, remove:

- the bolts (**5**) from the exhaust manifold lower heat shield,
- the lower heat shield from the exhaust manifold.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust manifold seal**.

❑ **parts always to be replaced: ring between exhaust manifold and catalytic converter**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the exhaust manifold joint face if it is to be re-used,
- the cylinder head joint face.

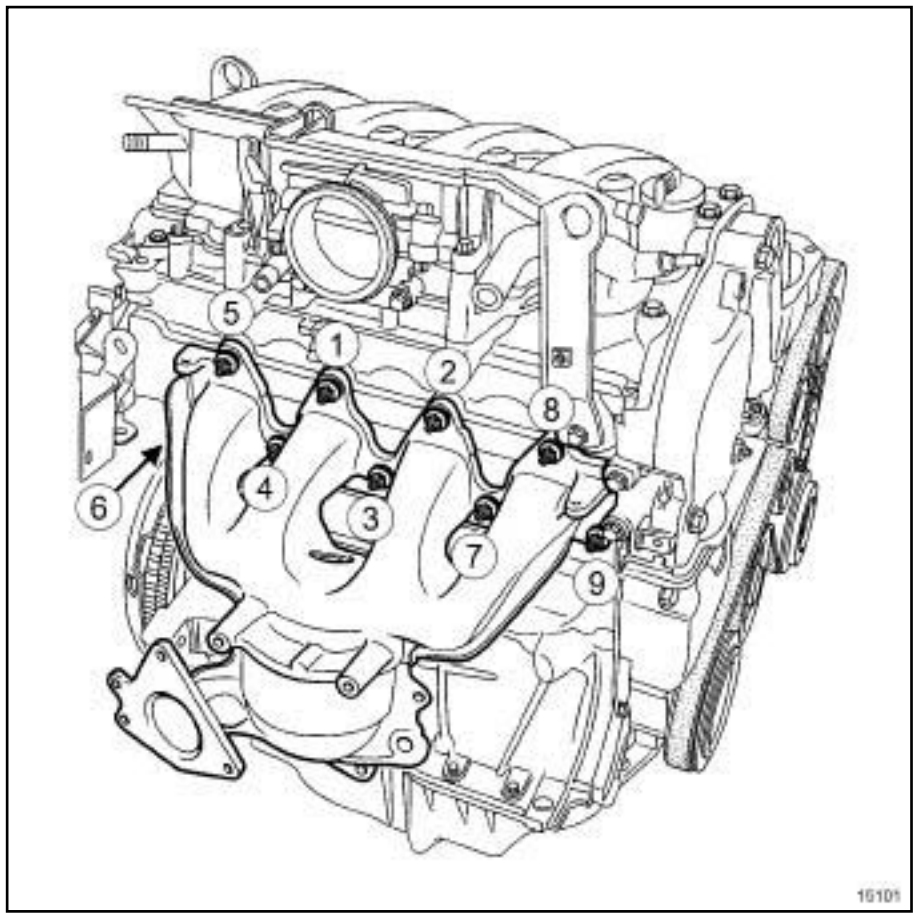
Note:

If a stud loosens during removal, coat it with **HIGH RESISTANCE THREADLOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Tighten to torque the **exhaust manifold studs (8 N.m)**.

K4M

II - REFITTING OPERATION FOR PART CONCERNED

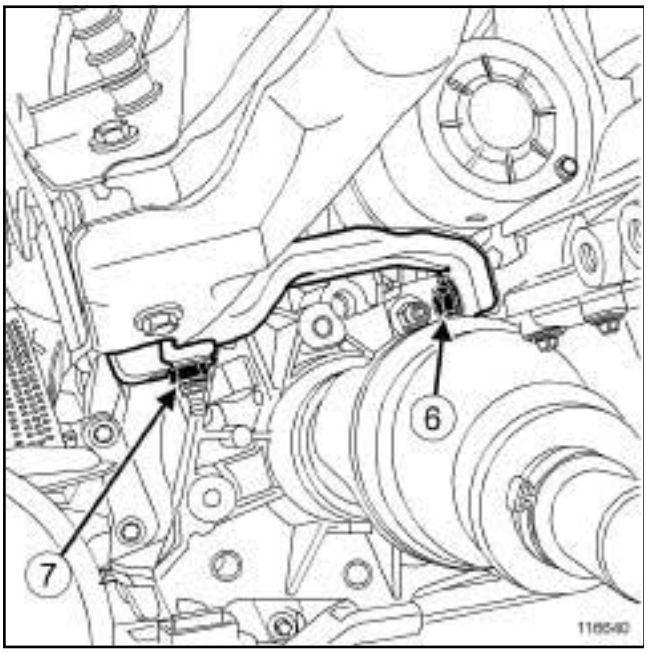


15101

❑ Refit the exhaust manifold.

❑ Tighten to torque and in order the **exhaust manifold mounting nuts (23 N.m)**.

III - FINAL OPERATION



116640

❑ Refit the stay between the exhaust manifold and the cylinder block.

❑ Tighten to torque and in order:

- the **bolts (6) mounting the stay on the cylinder block (21 N.m)**,
- the **nut (7) mounting the stay on the exhaust manifold (21 N.m)**.

❑ Refit the exhaust manifold upper heat shield.

❑ Torque tighten the **exhaust manifold upper heat shield mounting bolts (12 N.m)**.

❑ Refit the upstream oxygen sensor using the.

❑ Torque tighten the **upstream oxygen sensor (45 N.m)**.

❑ Connect the upstream oxygen sensor connector.

❑ Refit the exhaust bracket mounting bolts.

❑ Torque tighten the **exhaust bracket mounting bolts (21 N.m)**.

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (MR 388, 80A, Battery).

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
new turbocharger studs on the exhaust manifold	**9 N.m**
new turbocharger stud on the turbocharger	**9 N.m**
turbocharger nuts	**28 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

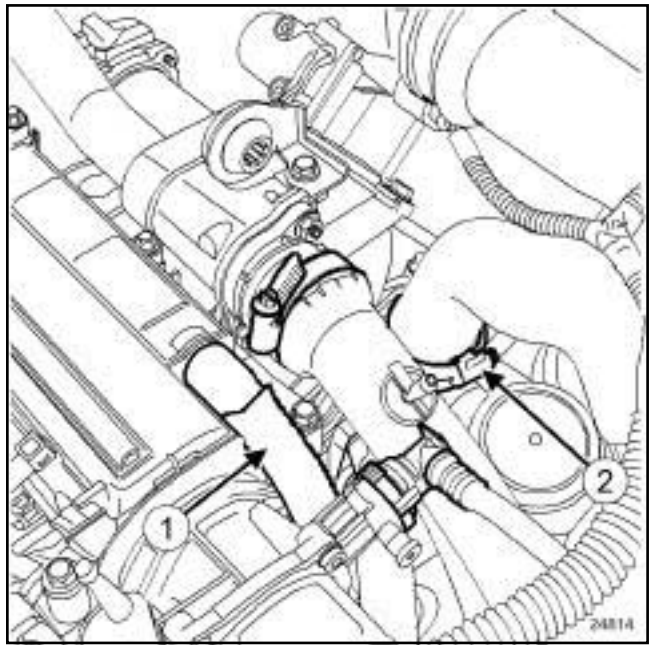
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .



24814

❏ Disconnect:

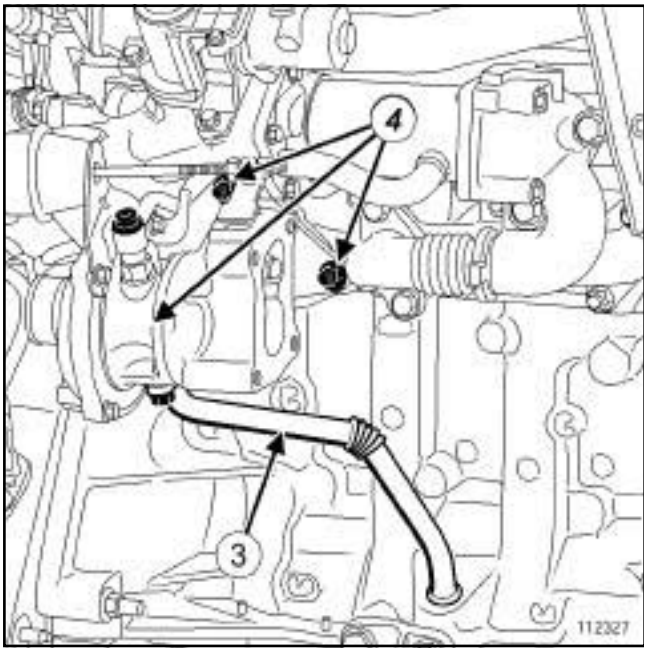
- the oil vapour rebreathing pipe (**1**) ,
- the duct between the turbocharger and the intercooler at (**2**) .

❏ Remove:

- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-4**) ,
- the air duct between the turbocharger and the air filter unit,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .

K9K

II - REMOVAL OPERATION



112327

❑ Remove (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-4**) :

- the turbocharger oil return pipe (**3**) ,
- the turbocharger oil supply pipe.

❑ Remove:

- the nuts (**4**) from the turbocharger on the exhaust manifold,
- the turbocharger,
- the turbocharger seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Turbocharger nut**.

❑ **parts always to be replaced: seal between exhaust manifold and turbocharger**.

❑ **parts always to be replaced: exhaust manifold stud on the turbocharger (if loosened)**.

WARNING

Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

WARNING

Following a turbocharger fault, check that the intercooler and air circuit assembly are not full of oil. If they are, remove them and clean them with a cleaning tray or station and dry them with a compressed air gun.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the exhaust manifold joint face,
- the turbocharger gasket face if reused.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the exhaust manifold joint face,
- the turbocharger joint face if it is to be reused,
- the housing of the turbocharger air outlet pipe seal,
- the joint face of the exhaust gas cooler mounting on the gearbox end.

WARNING

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Torque tighten:

- the **new turbocharger studs on the exhaust manifold (9 N.m)**,
- the **new turbocharger stud on the turbocharger (9 N.m)**.

II - REFITTING OPERATION

❑ Refit:

- a new turbocharger seal on the exhaust manifold,
- the turbocharger.

K9K

❑ Use an open wrench to fit the new turbocharger nuts without tightening them (the turbocharger must be in contact with the manifold and the wrench should no longer turn without effort).

❑ Torque tighten the **turbocharger nuts (28 N.m)**.

III - FINAL OPERATION

❑ Refit (see **12B**, **Turbocharging**, **Turbocharger oil pipe: Removal - Refitting**, page **12B-4**) :

- the turbocharger oil return pipe,
- the turbocharger oil supply pipe.

❑ Refit:

- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**)
- the engine undertray,
- the air duct between the turbocharger and the air filter unit,
- the exhaust gas recirculation solenoid valve (see **14A**, **Antipollution**, **Exhaust gas recirculation solenoid valve: Removal - Refitting**, page **14A-4**)

❑ Connect:

- the duct between the turbocharger and the intercooler onto the turbocharger,
- the oil vapour rebreathing pipe .

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Check

❑ Disconnect the flow actuator connector (engine starting inhibition).

❑ Run the starter motor until the oil pressure warning light goes out (wait for a few seconds).

❑ Switch off the ignition.

❑ Reconnect the fuel flow actuator connector.

❑ Make sure that there are no oil leaks.

❑ Connect the **Diagnostic tool** and clear the stored faults.

K9K

Equipment required
self-contained starter
Diagnostic tool

Tightening torques ▽	
new turbocharger oil supply pipe hollow bolt to the turbocharger	**Torx bolt 18 N.m or Hexagonal bolt 14 N.m**
turbocharger oil supply pipe nut on the cylinder head	**shouldered nut 35 N.m or non-shouldered nut 23 N.m**
turbocharger oil return pipe bolts	**12 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Wear cut-resistant gloves during the operation.

WARNING
Ensure that no foreign bodies enter the turbine or compressor during the refitting operation.

Check that the turbocharger oil return pipe is not partially or completely blocked by scale. Check that there are no leaks. If there are, replace the part.

WARNING
Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to observe the following instructions will lead to the turbocharger breaking again.

Note:
This procedure deals with removing and refitting the turbocharger oil return pipe and the turbocharger oil supply pipe.

REMOVING THE TURBOCHARGER OIL SUPPLY PIPE

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

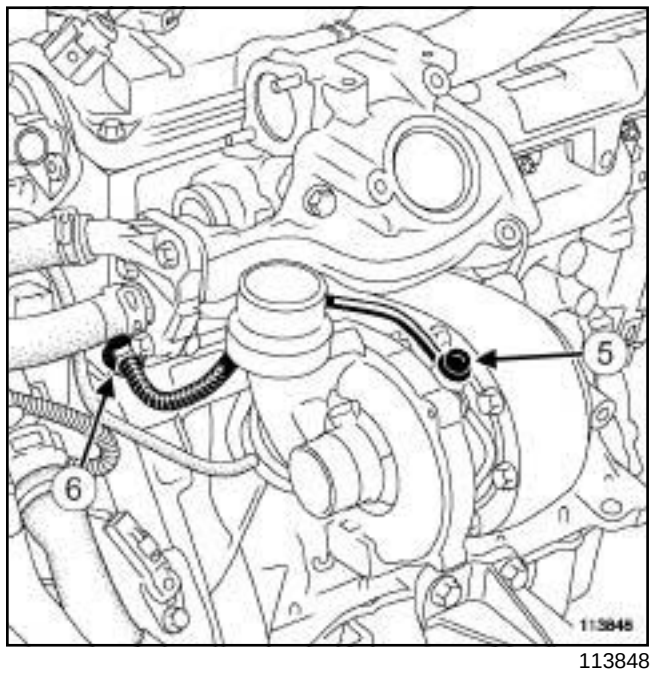
❑ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

❑ Remove:

- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .

II - REMOVAL OPERATION



113848

❑ Loosen the nut (**6**) for the turbocharger oil supply pipe on the cylinder head, using the tool.

K9K

❑ Remove:

- the turbocharger oil supply pipe hollow boltfrom the turbocharger,
- the turbocharger oil supply pipe.

❑ Wipe away any oil run-off.

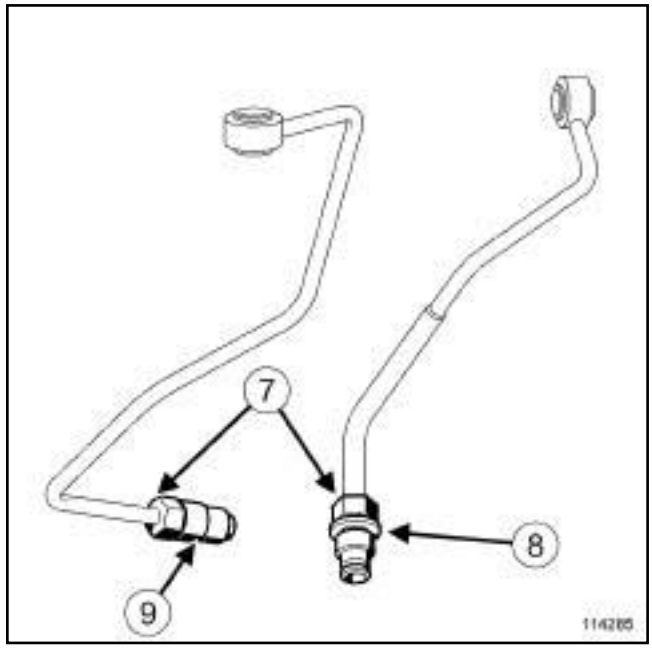
REFITTING THE TURBOCHARGER OIL SUPPLY PIPE

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger oil supply pipe**

❑ **parts always to be replaced: turbocharger oil pipe seal**

❑ **parts always to be replaced: Turbocharger oil supply pipe bolt**



114285

❑

Note:

These two turbocharger oil supply pipes may be used on the same engine. The tightening torque of the end pieces (**7**) on the cylinder head is different, depending on the following:

- if the end piece is **shouldered** (**8**) ; in this case, there is no need to apply **HIGH RESISTANCE THREADLOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the thread of the end piece,
- if the end piece is **not shouldered** (**9**) ; in this case, it is essential to apply **HIGH RESISTANCE THREADLOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the thread of the end piece.

II - REFITTING OPERATION

❑ Refit a new turbocharger oil supply pipe.

❑ Fit the turbocharger oil supply pipe nut on the cylinder head, without tightening it.

❑ Refit a new hollow bolt for the turbocharger oil supply pipe on the turbocharger.

❑ Torque tighten:

- a **new turbocharger oil supply pipe hollow bolt to the turbocharger (Torx bolt 18 N.m or Hexagonal bolt 14 N.m)**,

- the **turbocharger oil supply pipe nut on the cylinder head (shouldered nut 35 N.m or non-shouldered nut 23 N.m)** using toolor tool.

III - FINAL OPERATION

❑ Refit:

- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) ,
- the engine undertray.

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Disconnect the high pressure pump flow actuator connector and the connector for each diesel fuel injector in order to prevent the engine from starting.

❑ Connect a **self-contained starter**.

❑ Run the starter until the oil pressure warning light goes out on the instrument panel (wait for a few seconds).

❑ Switch off the ignition.

❑ Disconnect the **self-contained starter**.

❑ Connect the high pressure pump flow actuator connector and the connector for each diesel fuel injector.

❑ Start the engine.

❑ Let the engine idle then depress the accelerator several times with no load.

❑ Switch off the ignition.

❑ Check:

- that the turbocharger is operating correctly,
- that there are no oil leaks from the turbocharger.

❑ Use the **Diagnostic tool** to check for an absence of stored faults; deal with these and clear them as necessary.

REMOVING THE TURBOCHARGER OIL RETURN PIPE

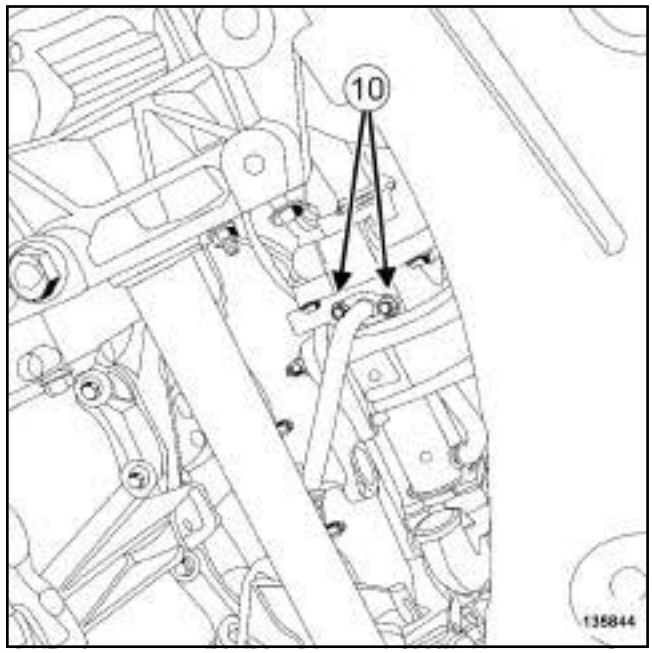
❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

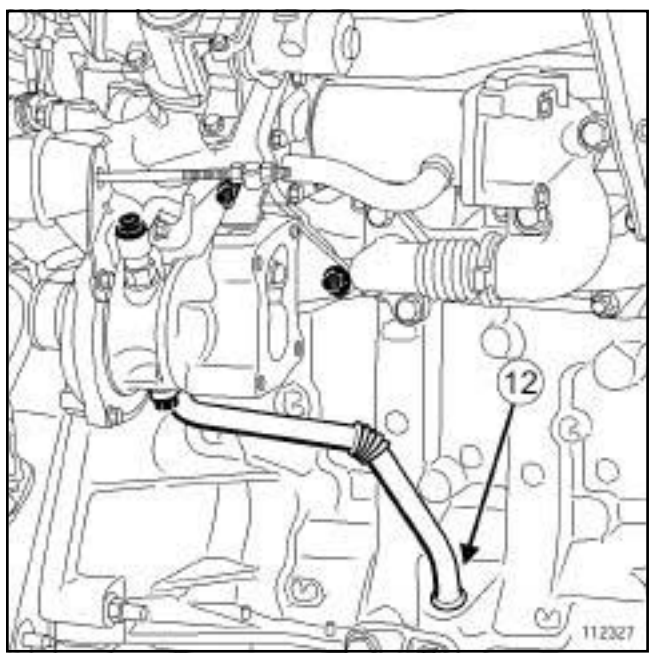
- the engine undertray bolts,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .

REMOVAL OPERATION



135844

❑ Remove the turbocharger oil return pipe bolts (**10**) .



112327

❑ Rotate the turbocharger oil return pipe (**12**) to facilitate its removal.

K9K

❑ Extract the turbocharger oil return pipe from the cylinder block.

❑ Remove the turbocharger oil return pipe seals.

REFITTING THE TURBOCHARGER OIL RETURN PIPE

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: turbocharger oil pipe seal**.

❑ Use **SURFACE CLEANER** (see **Vehicle: Towing and lifting**) (04B, Consumables - Products) to clean and degrease:

- the seal housing on the turbocharger oil return pipe if it is to be reused,
- the turbocharger oil return pipe joint face if it is to be reused,
- the turbocharger oil return pipe joint face on the turbocharger,
- the turbocharger oil return pipe housing in the cylinder block.

WARNING

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Lubricate the turbocharger oil return pipe O-ring with clean engine oil.

II - REFITTING OPERATION

❑ Proceed in the reverse order to removal.

❑ Torque tighten the **turbocharger oil return pipe bolts (12 N.m)**.

K9K

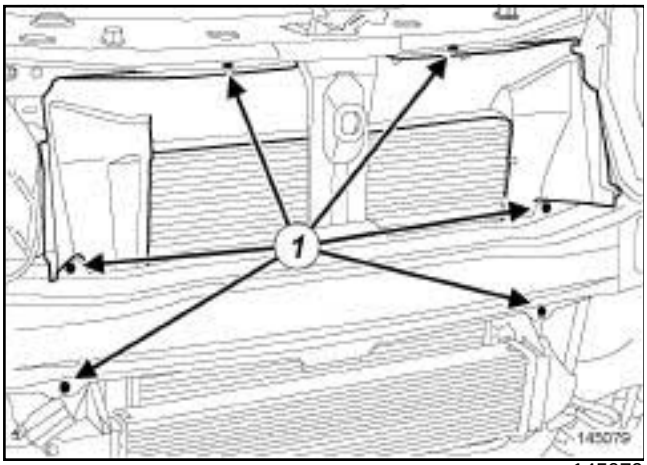
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

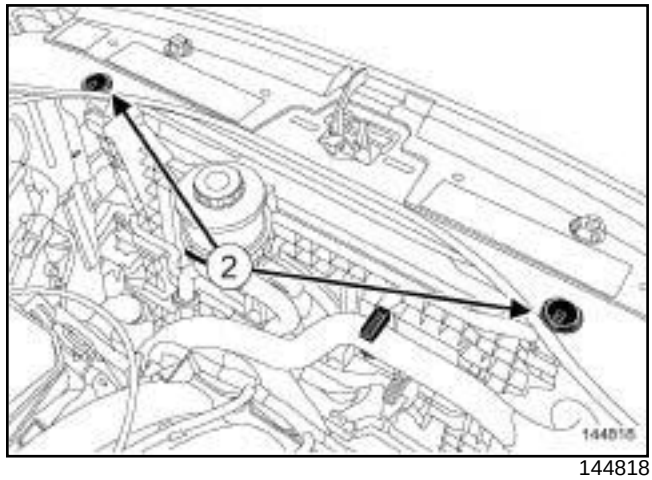
❑ Remove the front bumper (see **Front bumper assembly: Exploded view**) (55A, Exterior protection).



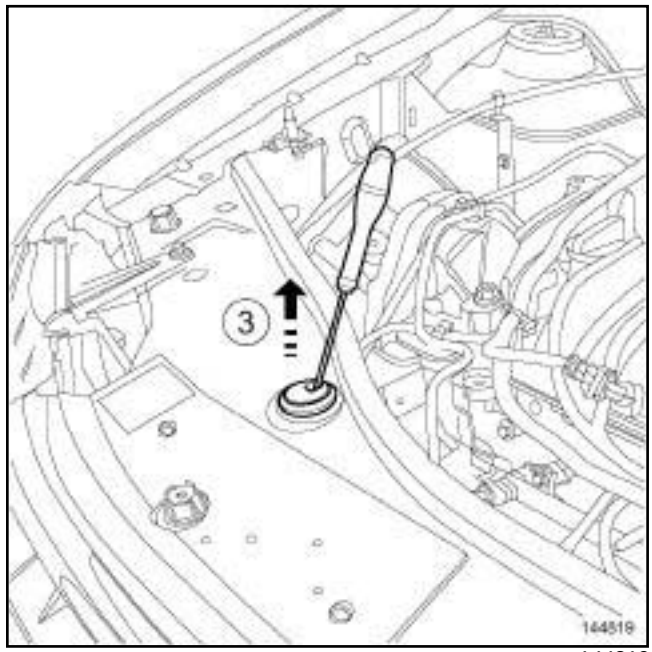
145079

❑ Remove:

- the air deflector mounting pins (**1**) ,
- the air deflector.



144818



144819

❑ Press the clips of the fan assembly centring pins (**2**) using a screwdriver and pull them in the direction of the arrow (**3**) .

❑ Remove the fan assembly centring pins (**2**) .

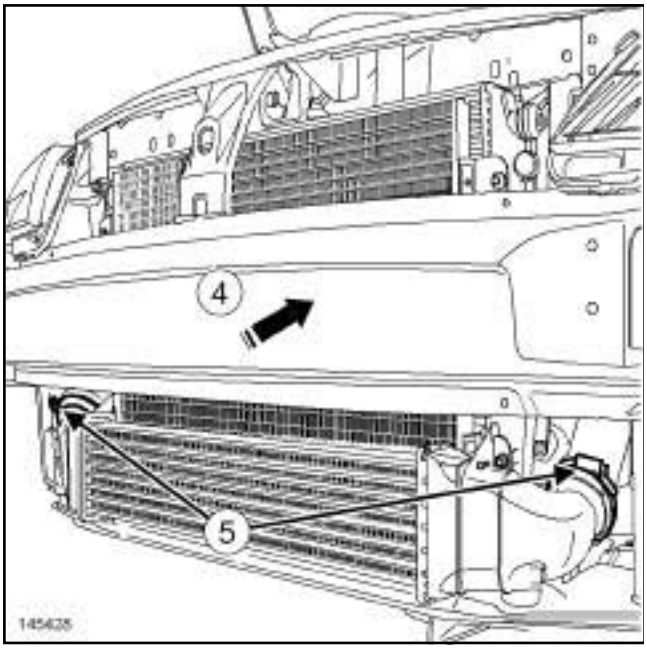
II - REMOVAL OPERATION

❑

Note:

Do not damage the cooling unit vanes (radiator, condenser, etc.) during handling.

K9K

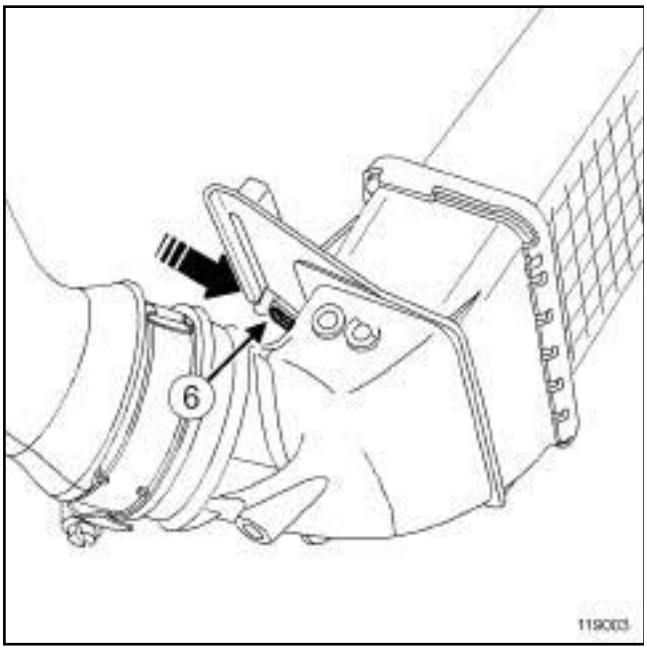


145428

❏ Push the « radiator - fan » assembly in the direction of the arrow (**4**) in order to remove the intercooler.

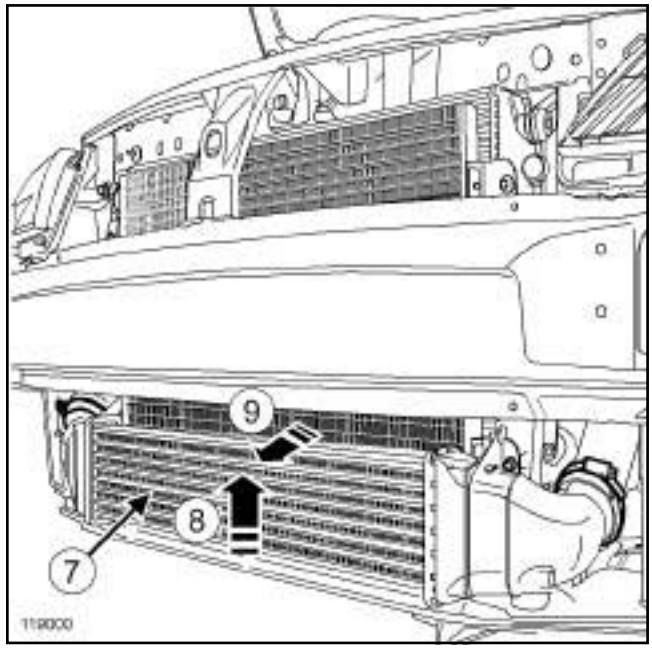
❏ Remove the clips (**5**) of the intercooler ducts.

❏ Disconnect the intercooler ducts.



119003

❏ Press the end piece of the intercooler mounting at (**6**) , in the direction of the arrow, to unclip it.



119000

❏ Remove the intercooler (**7**) in the direction of the arrows (**8**) then (**9**) .

REFITTING

I - REFITTING PREPARATION OPERATION

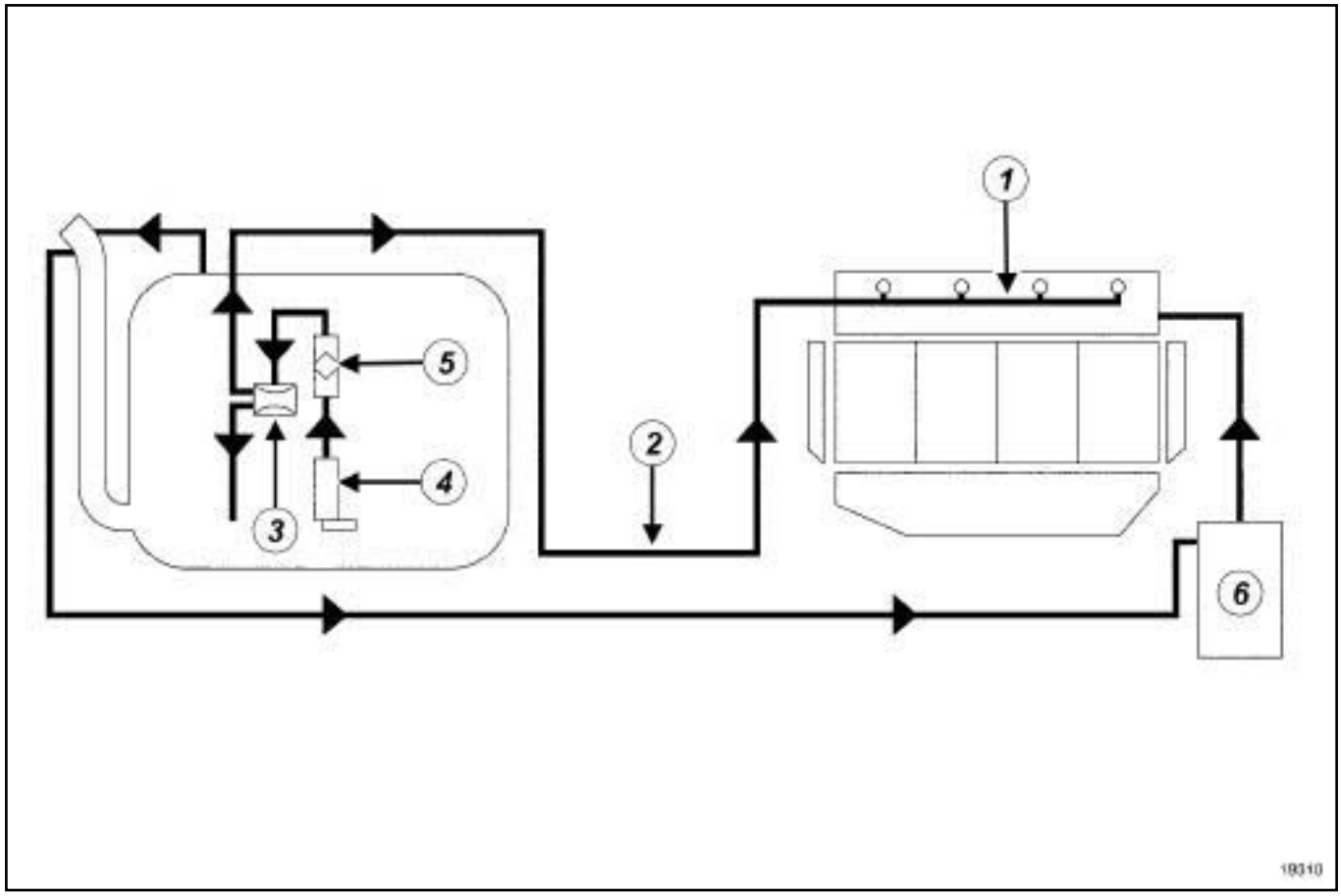
❏ Check that the intercooler is not full of oil. If this is the case, clean it with a cleaning agent and then let it dry.

II - REFITTING OPERATION

❏ Proceed in the reverse order to removal.

K4M

Operating diagram of the fuel supply circuit (« pump - sender - fuel filter » assembly)



19310

The fuel supply circuit does not have a return.

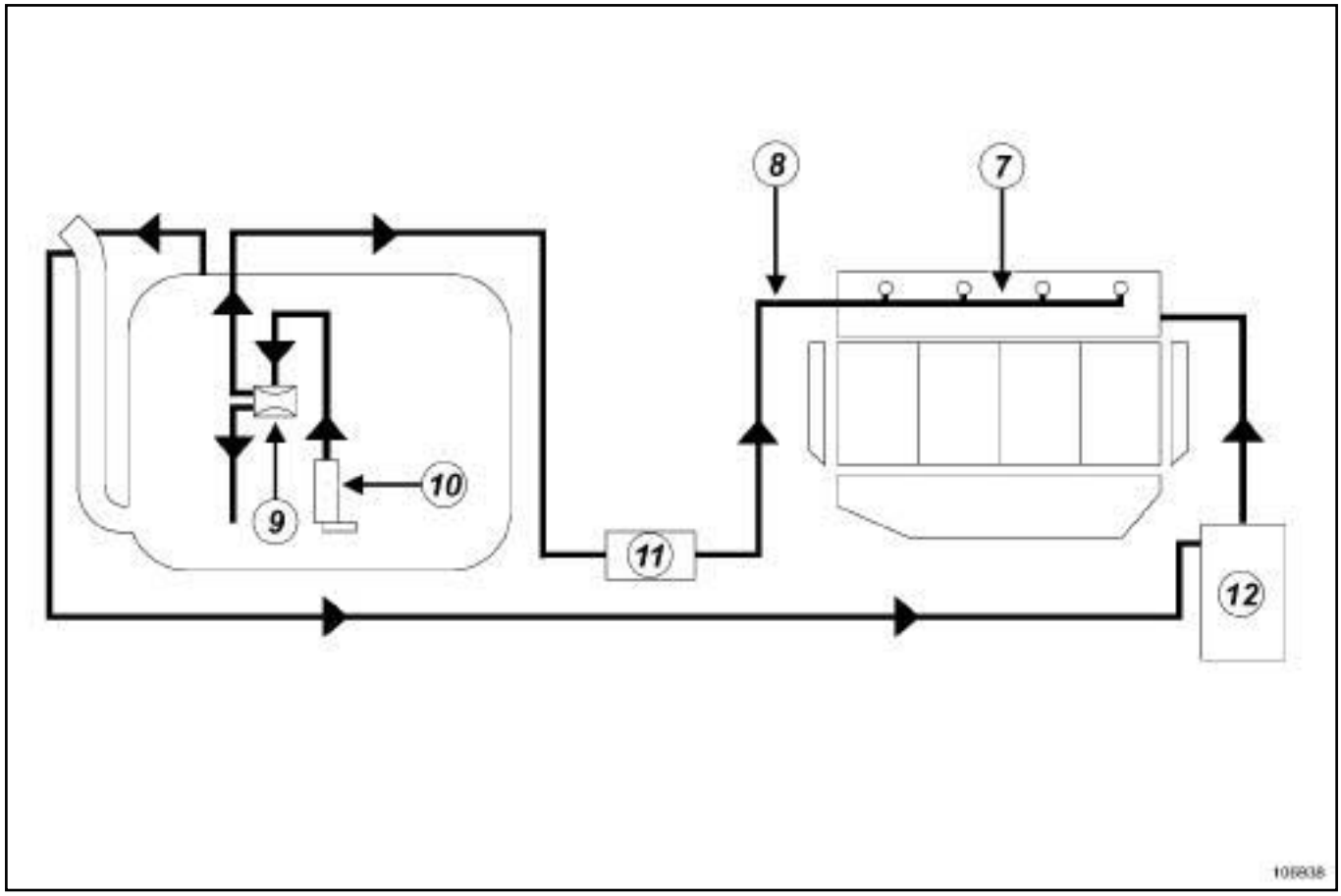
The fuel pressure does not vary with engine load.

The circuit comprises:

- a rail (**1**) without a return pipe and without a supply pressure regulator,
- a single pipe (**2**) coming from the tank,
- a « pump-sender-fuel filter » assembly fitted with the pressure regulator (**3**) , the pump (**4**) and the fuel filter (**5**) (all located in the tank),
- a fuel vapour recirculation tank (**6**) .

K4M

Operating diagram of the fuel supply circuit (external filter)



106938

The fuel supply circuit does not have a return.

The fuel pressure does not vary with engine load.

The circuit comprises:

- a rail (**7**) without a return pipe union and without a supply pressure regulator,
- a single pipe (**8**) coming from the tank,
- a « pump-fuel sender » supply assembly fitted with the pressure regulator (**9**) , the pump (**10**) and the fuel filter (**11**) ,
- a fuel vapour recirculation tank (**12**) .

K9K

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **Diesel injection: Precautions for the repair**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

Note:

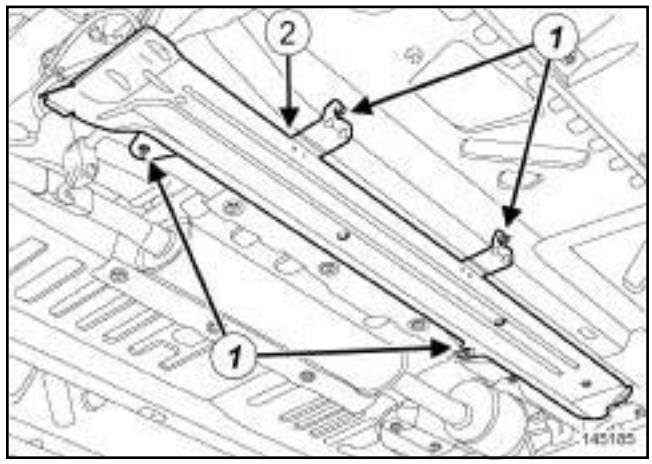
The priming pump is incorporated in the fuel supply pipe.

To remove the priming pump, remove the fuel supply pipe assembly.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).



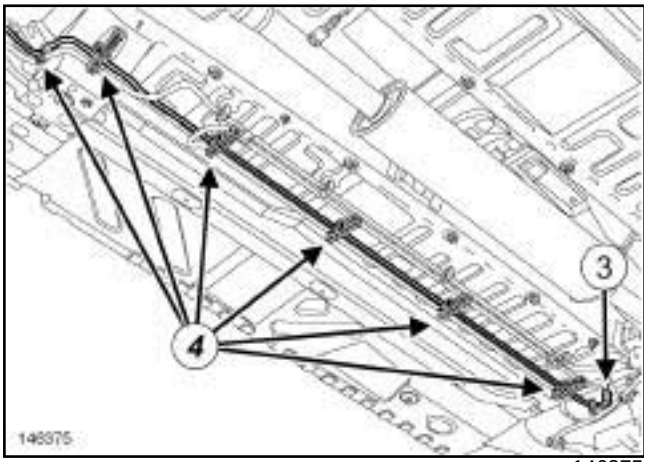
145185

❑ Remove:

- the fuel supply pipe protector nuts (**1**) ,
- the fuel supply pipe protector (**2**) .

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED

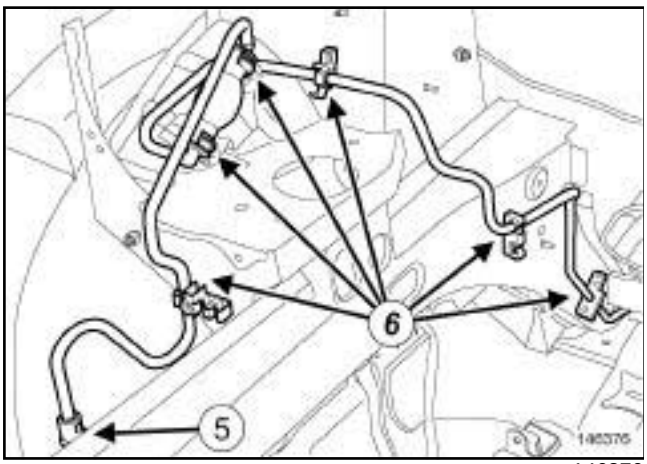


146375

❏ Disconnect the fuel supply pipe at the fuel tank end at (**3**) .

❏ Insert the blanking plugs.

❏ Unclip the fuel supply pipe under the body at (**4**) .



146376

❏ Disconnect the connection (**5**) from the fuel supply pipe on the fuel filter.

❏ Unclip the fuel supply pipe at (**6**) .

❏ Remove the fuel supply pipe through the engine compartment.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Proceed in the reverse order to removal.

❏ Ensure that the fuel supply pipe unions are clicked into position properly.

II - FINAL OPERATION

❏ Prime the fuel circuit using the priming pump.

WARNING

Check that there are no leaks:

- run the engine at idle speed for **2 minutes**,
- accelerate several times at no load,
- switch off the ignition,
- check that there is no fuel escaping.

K9K

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair:

- (see **Diesel injection: Precautions for the repair**) ,
- (see **Vehicle: Precautions for the repair**) (01D, Mechanical introduction).

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

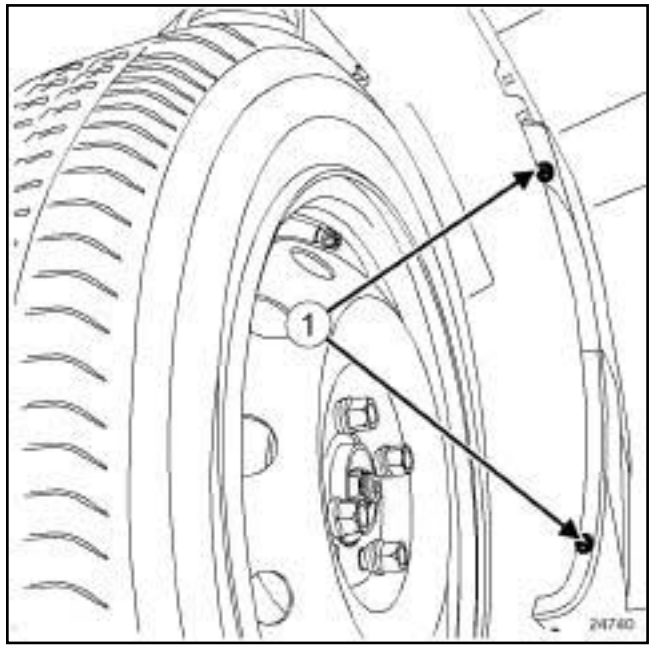
Note:

Make sure you have a new diesel filter before opening the fuel circuit.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).



24740

❑ Remove:

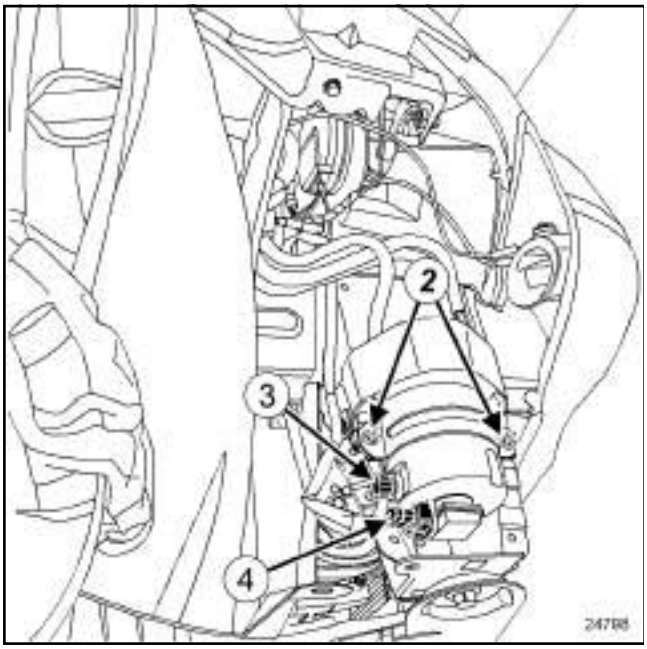
- the plastic screen under the diesel filter,
- the front right-hand wheel arch liner bolts (**1**) .

❑ Move the front right-hand wheel arch liner slightly to one side.

K9K

II - REMOVAL OPERATION

MAHLE type filter



24798

❏ Remove:

- the diesel filter protection plate nuts (**2**) ,
- the diesel filter protection plate,
- the diesel filter from its mounting, noting its original position.

❏ Disconnect the water detection sensor connector (**4**) .

❏ Place a container under the diesel filter.

❏ Open the bleed screw (**3**) and let the diesel run out.

WARNING

Keep the pipe unions away from contaminated areas.

Note:

Mark the position of the fuel pipe unions in relation to the diesel filter before removing the diesel filter.

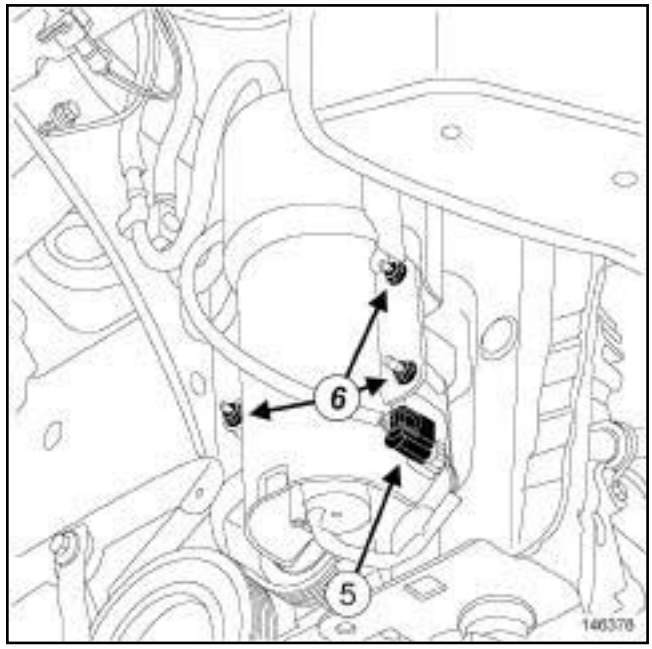
❏ Disconnect the pipe unions on the diesel filter.

❏ Let the diesel fuel flow out from the various pipes into the container.

❏ Fit plugs into the openings.

❏ Remove the water detection sensor, turning it anti-clockwise.

DELPHI type filter



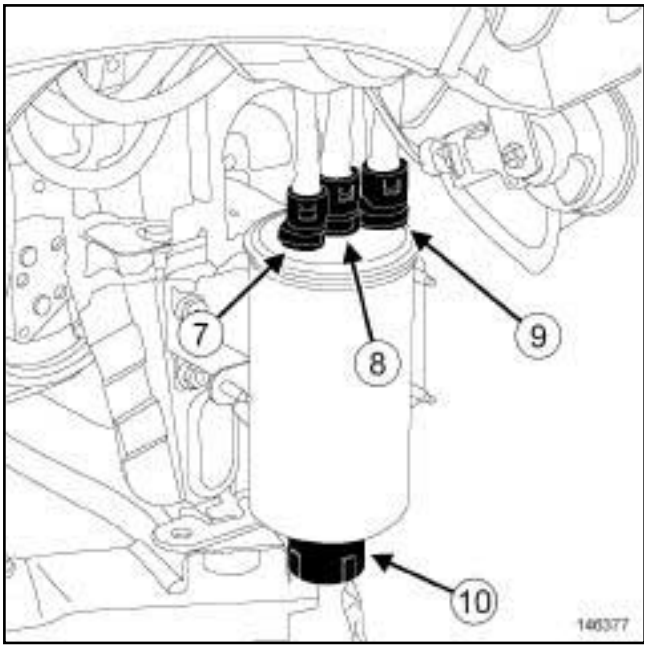
146378

❏ Disconnect the water detection sensor connector (**5**) .

❏ Remove:

- the diesel filter protection plate nuts (**6**) ,
- the diesel filter protection plate,
- the diesel filter from its mounting, noting its original position.

❏ Place a container under the diesel filter.



146377

❑ Disconnect:

- the fuel inlet pipe union (**7**) ,
- the fuel outlet pipe union (**8**) ,
- the fuel return pipe union (**9**) .

❑ Let the diesel fuel flow out from the various pipes into the container.

❑ Remove the water detection sensor (**10**) , turning it anti-clockwise.

❑ Fit plugs into the openings.

REFITTING

I - REFITTING OPERATION

❑ Refit the water detection sensor, turning it clockwise.

❑ Connect:

- the pipe unions on the diesel filter,
- the water detection sensor connector.

❑ Refit:

- the new diesel filter in its original position,
- the diesel filter protection plate,
- the diesel filter protection plate nuts.

II - DRAINING THE WATER INSIDE THE DIESEL FILTER

❑

Note:

- Certain vehicles have a sensor for detecting water in the diesel fuel, located in the diesel filter. If water is detected, the injection fault warning light comes on.

❑ Periodically drain any water contained in the diesel filter.

❑ For filters without a water presence sensor:

- open the drain plug,
- let the water flow out,
- close the plug.

❑ For filters with a water presence sensor:

- disconnect the water presence sensor connector,
- unclip the water presense sensor connector,
- loosen the water presence sensor by one turn,
- let the water flow out,
- tighten the water presence sensor,
- connect the water presence sensor connector.

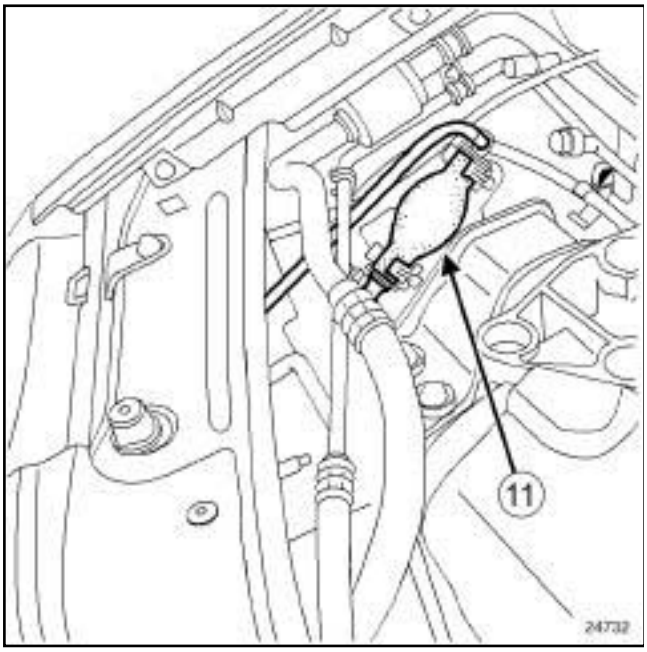
III - FINAL OPERATION

❑ Refit:

- the front right-hand wheel arch liner,
- the plastic screen under the diesel filter.

K9K

Priming the supply circuit



24732

❑ Prime the fuel system with the manual priming pump (**11**) (automatic degassing).

K4M

Special tooling required	
Mot. 1311-08	Union for taking fuel pressure measurements.

Tightening torques ▽	
fuel pipe protector nuts	**7 N.m**
fuel pipe protector bolt	**7 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects near the working area,
- beware of fuel splashes when disconnecting the union,
- protect sensitive areas from fuel outflow.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (nitrile type) for this operation.

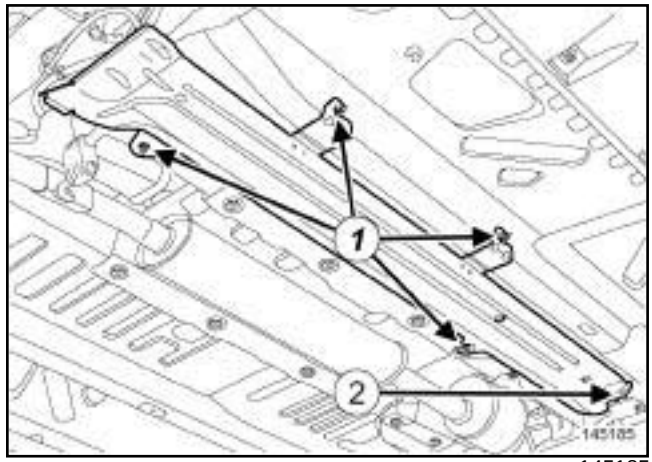
WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

CHECK

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

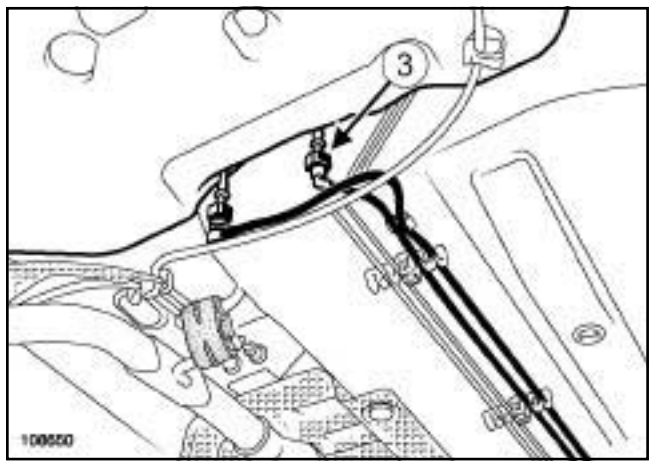
❑ Switch off the ignition.



145185

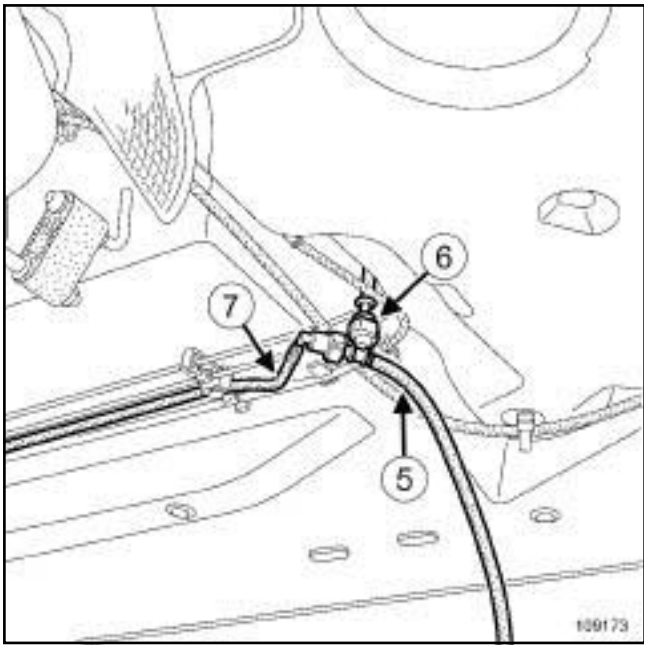
❑ Remove:

- the nuts (**1**) and the bolt (**2**) from the fuel pipe protector,
- the fuel pipe protector.



108650

❑ Disconnect the fuel supply pipe union (**3**) .



109173

❏ Connect:

- the « T » union **(Mot. 1311-08)** (**6**) to the fuel tank outlet pipe,
- the pipe (**5**) fitted with a pressure gauge contained in the test kitonto the « T » union (**6**) ,
- the fuel supply pipe (**7**) to the « T » union (**6**) .

❏ Start the vehicle to run the fuel pump.

❏ Determine the pressure:

- the pressure must be constant (approximately **3.5 bar ± 0.2 bar**),
- It may take a few seconds to obtain a correct pressure reading.

❏ Disconnect:

- the pipe fitted with the pressure gauge contained in the test kitfrom the « T » union,
- the « T » union **(Mot. 1311-08)** from the fuel tank outlet pipe.

❏ Connect the fuel supply pipe union to the fuel tank outlet pipe.

❏ Refit the fuel supply pipe protector.

❏ Torque tighten:

- the **fuel pipe protector nuts (7 N.m)**,
- the **fuel pipe protector bolt (7 N.m)**.

K4M

Special tooling required	
Mot. 1311-08	Union for taking fuel pressure measurements.

Tightening torques ▽	
fuel pipe protector nuts	**7 N.m**
fuel pipe protector bolt	**7 N.m**

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects near the working area,
- beware of fuel splashes when disconnecting the union,
- protect sensitive areas from fuel outflow.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (nitrile type) for this operation.

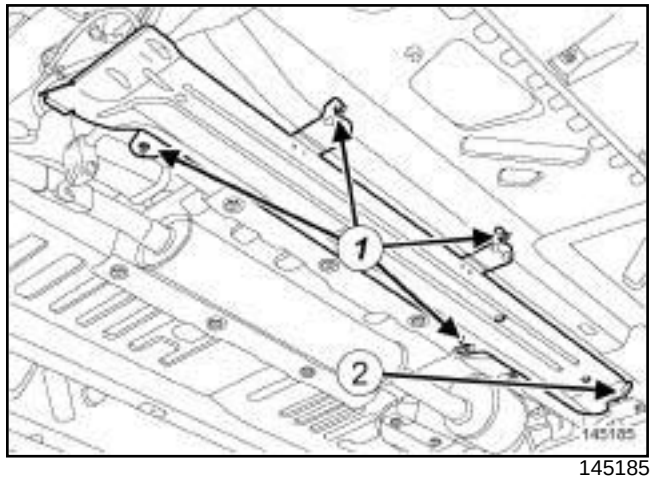
WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

CHECK

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

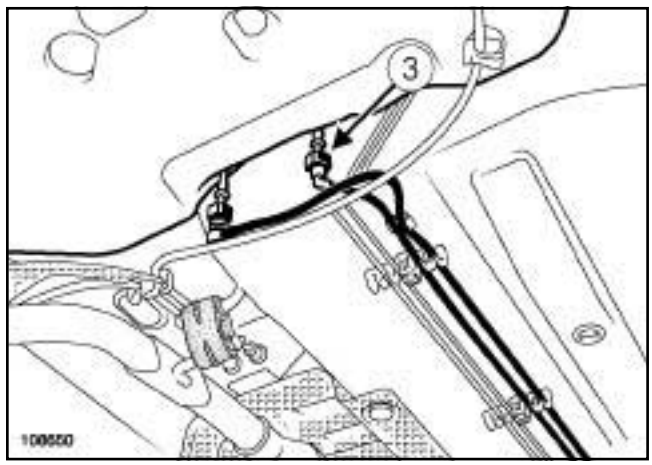
❑ Switch off the ignition.



145185

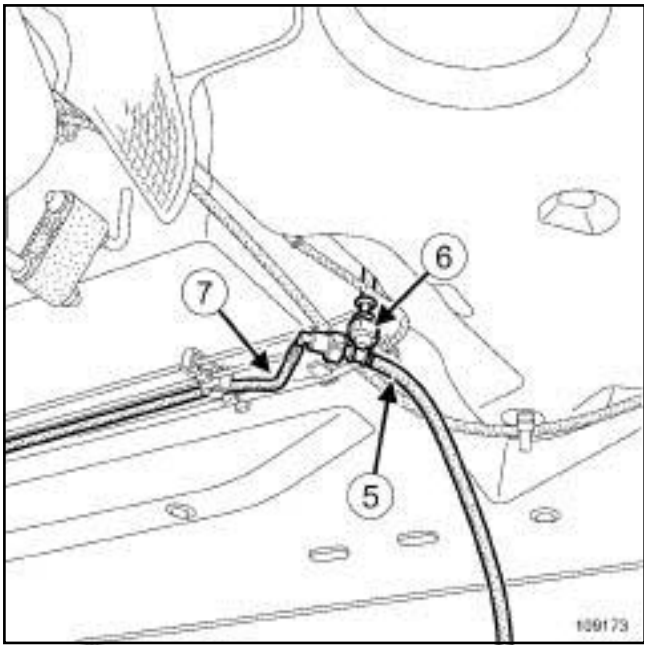
❑ Remove:

- the nuts (**1**) and the bolt (**2**) from the fuel pipe protector,
- the fuel pipe protector.



108650

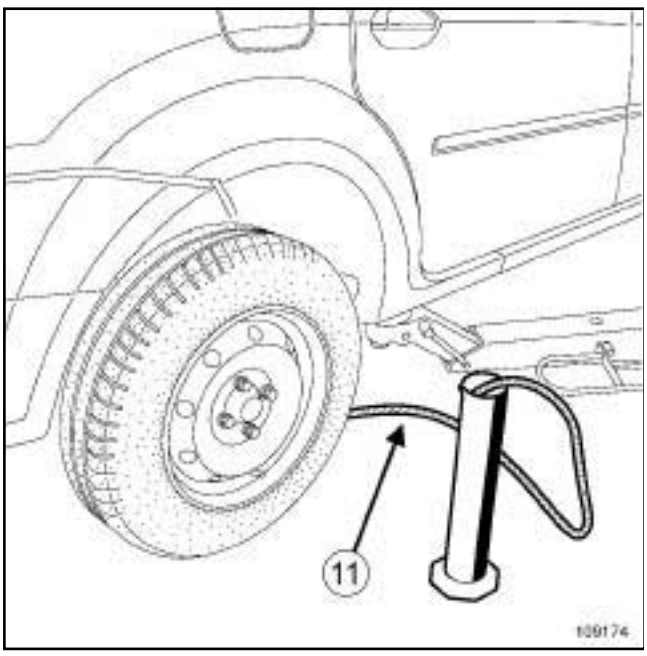
❑ Disconnect the fuel supply pipe union (**3**) .



109173

❑ Connect:

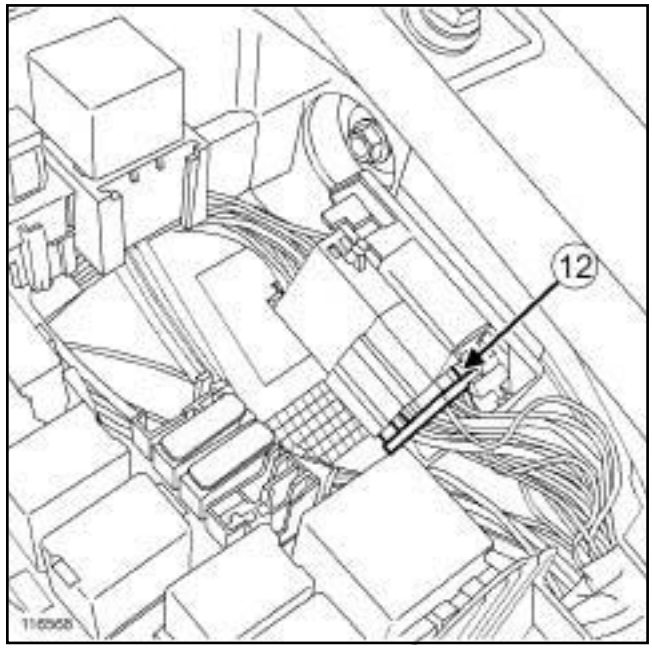
- the « T » union **(Mot. 1311-08)** (**6**) to the fuel tank outlet pipe,
- the pipe (**5**) contained in the test kitonto the « T » union (**6**) ,
- the fuel supply pipe (**7**) to the « T » union (**6**) .



109174

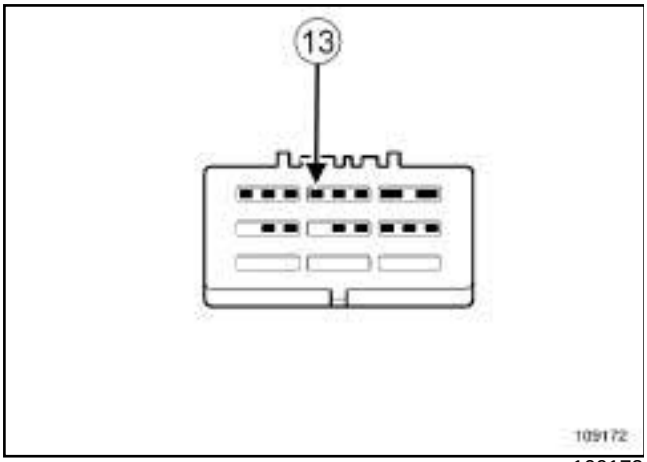
❑ Insert the pipe (**11**) into a graduated measuring cylinder (**2000 ml**).

❑ Remove the Protection and Switching Unit cover.



116568

❑ Disconnect the connector (**12**) from the passenger compartment engine harness.



109172

❏ Connect the connector terminal (**13**) to the + **BATTERY** to operate the fuel pump.

❏ Note the time taken for the measuring cylinder to fill up.

> Note:
>
> The minimum flow rate from the fuel pump is **60 l/h**.

❏ Remove the terminal (**13**) of the + **BATTERY** connector.

❏ Refit the Protection and Switching Unit cover.

❏ Disconnect:

- the pipe fitted with the pressure gauge contained in the test kitfrom the « T » union,
- the « T » union **(Mot. 1311-08)** from the fuel tank outlet pipe.

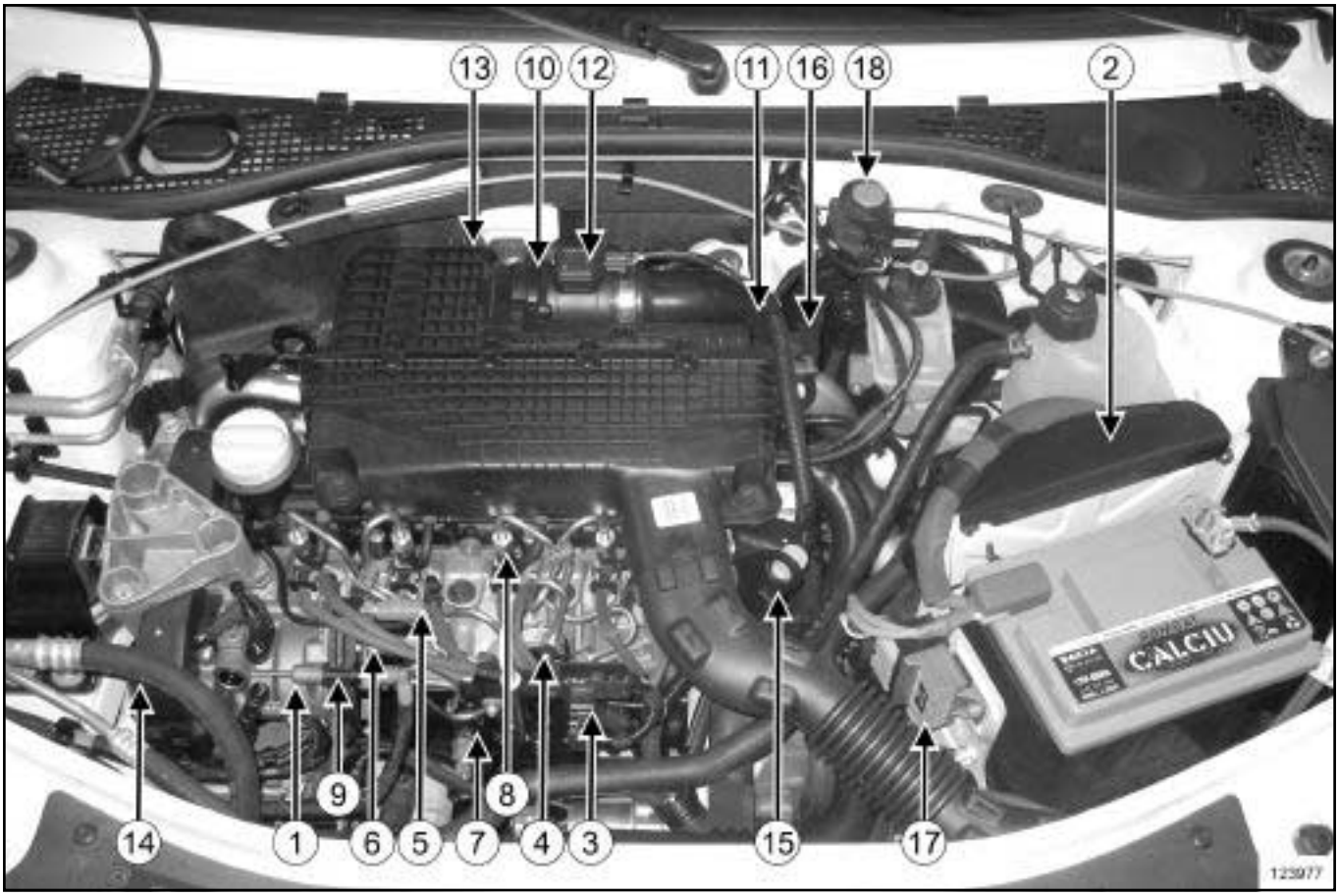
❏ Connect the fuel supply pipe union to the tank outlet pipe.

❏ Refit the fuel supply pipe protector.

❏ Torque tighten:

- the **fuel pipe protector nuts (7 N.m)**,
- the **fuel pipe protector bolt (7 N.m)**.

K9K, and 796

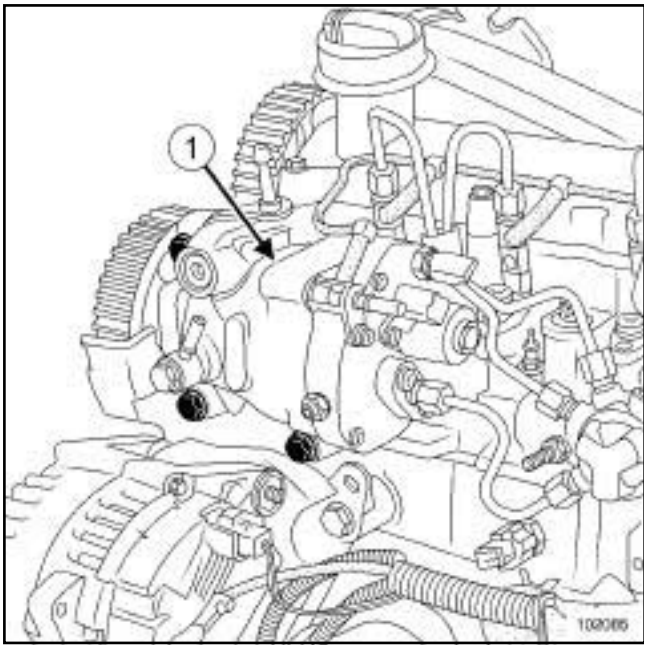


123977

No.	Description
1	High pressure pump
2	Injection computer
3	Injector rail pressure sensor
4	Spherical injector rail
5	Diesel temperature sensor
6	Diesel fuel flow actuator
7	Accelerometer
8	Injector
9	Venturi
10	Exhaust gas recirculation solenoid valve
11	Turbocharging air pressure sensor
12	Air flowmeter with integrated temperature sensor

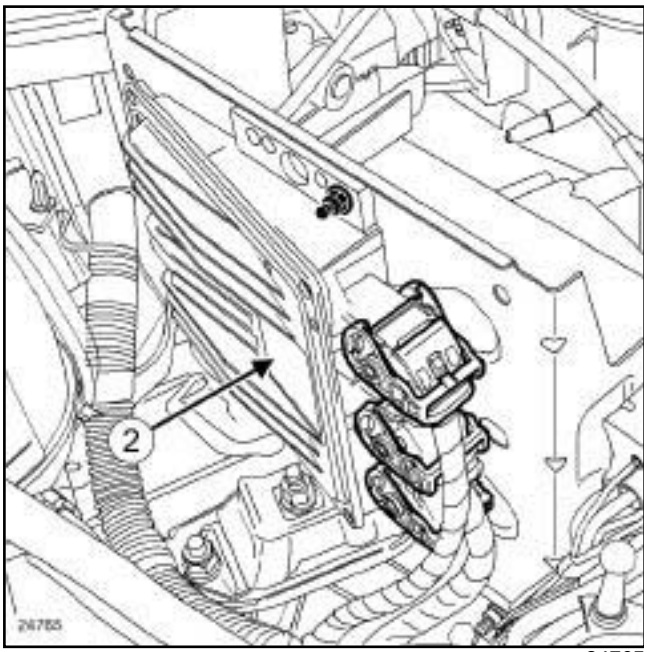
No.	Description
13	Turbocharger
14	Cylinder reference sensor
15	Coolant temperature sensor
16	TDC sensor
17	Pre-postheating unit
18	Turbocharger control solenoid valve (only for K9K 796 engine)
19	Accelerator pedal potentiometer

K9K, and 796



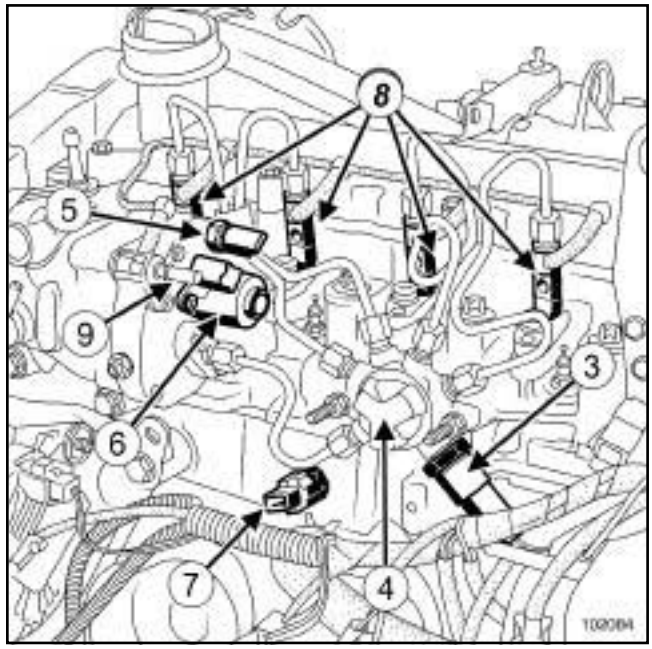
102085

High-pressure pump (**1**) .



24765

Injection computer (**2**) .



102084

Injector rail pressure sensor (**3**) ,

Spherical injector rail (**4**) ,

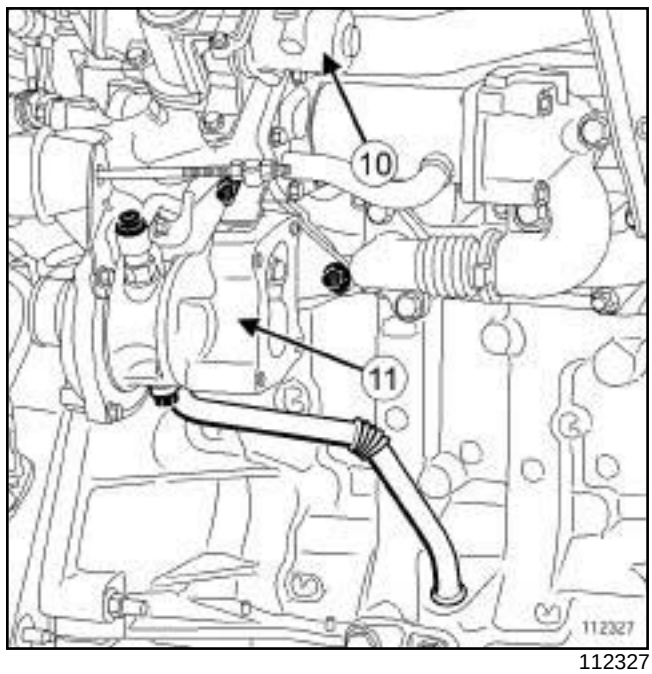
Diesel temperature sensor (**5**) ,

Diesel fuel flow actuator (**6**) ,

Accelerometer (**7**) ,

Injectors (**8**) ,

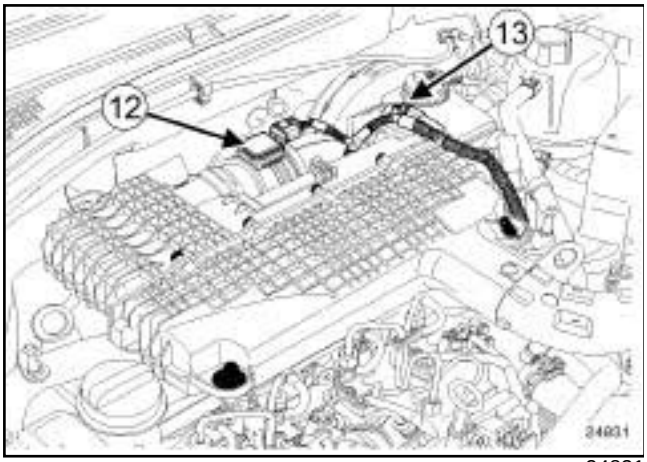
Venturi (**9**) .



112327

Exhaust gas recirculation solenoid valve (**10**) ,

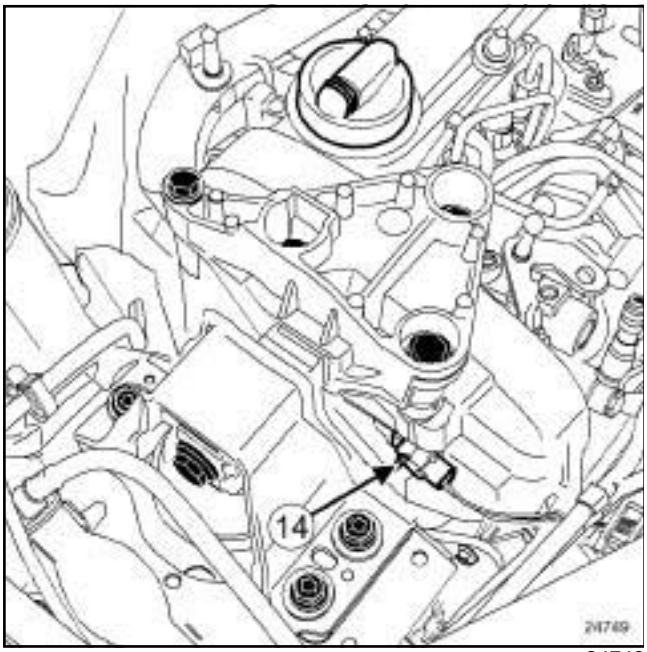
Turbocharger (**11**) .



24831

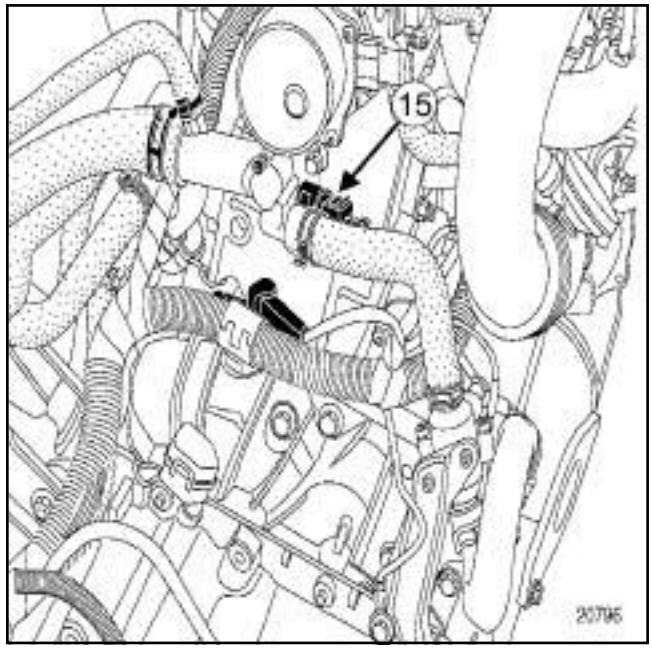
Air flowmeter with integrated temperature sensor (**12**) ,

Turbocharging air pressure sensor (**13**) .



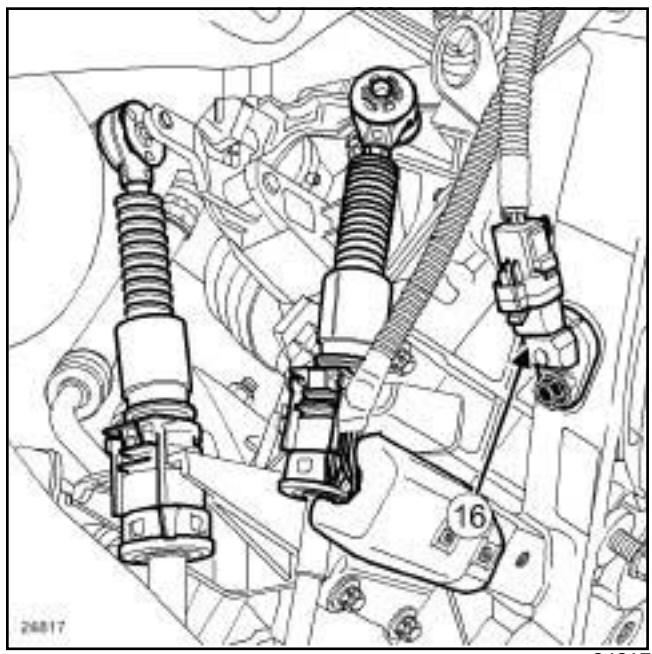
24749

Cylinder marking sensor (**14**) .



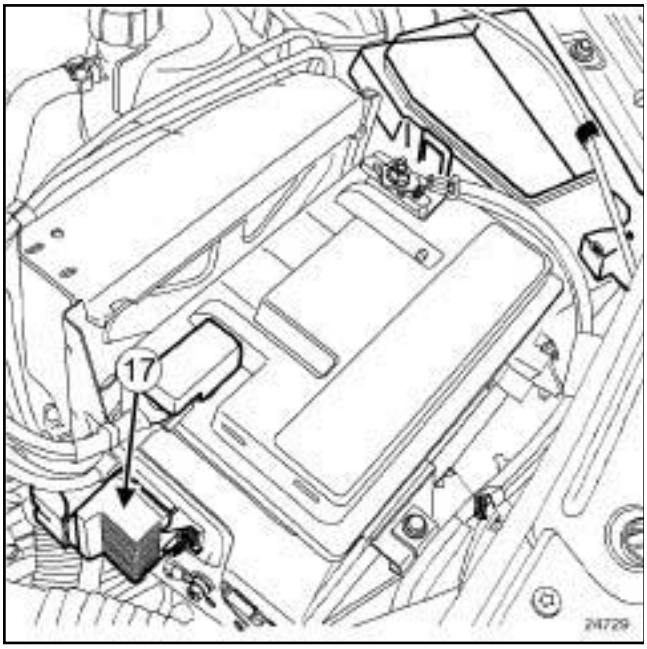
20796

Coolant temperature sensor (**15**) .



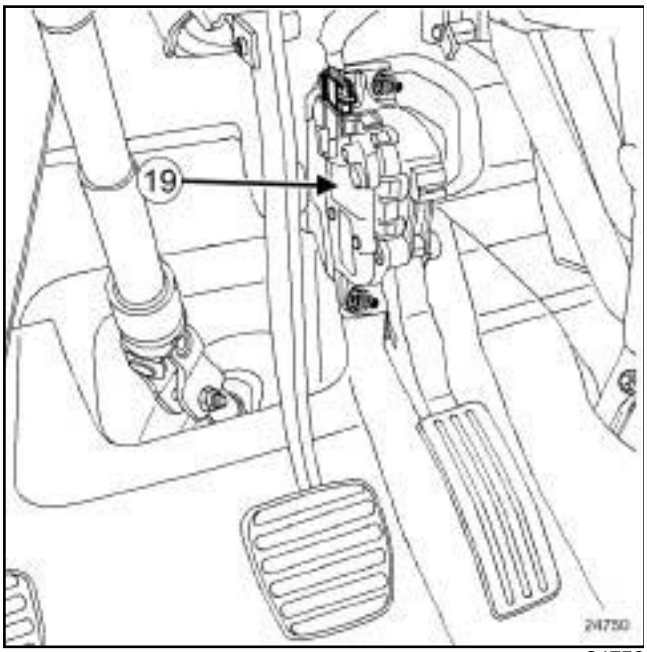
24817

Top Dead Centre sensor (**16**) .



24729

Pre-postheating unit (**17**) .



24750

Accelerator pedal potentiometer (**19**) .

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
injection computer nuts	**8 N.m**
injection computer protector bolts	**8 N.m**

Note:

When programming, reprogramming or replacing the computer, it is necessary to program the new computer with the C2I parameters (injector flow correction) and the engine adaptives using the **Diagnostic tool**.

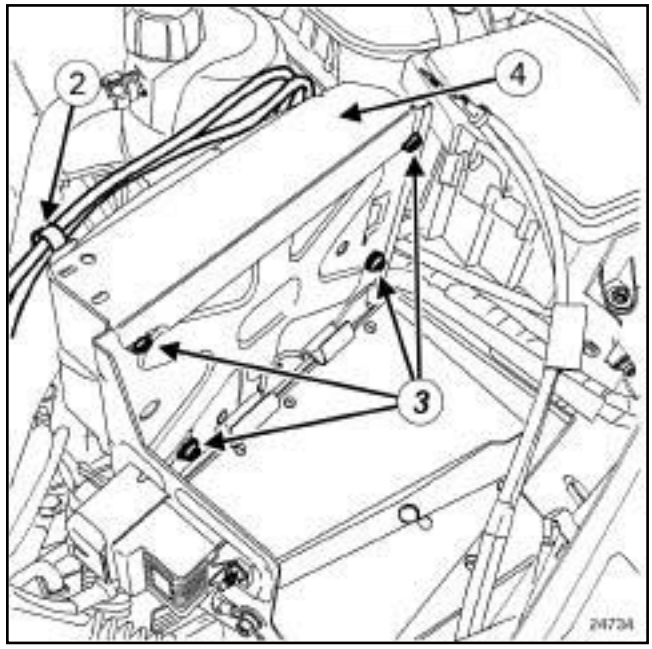
There are two ways to do this (see **Fault finding - Replacement of components**) (13B, Diesel injection):

- an automatic method which can be used if it is possible to read the information contained in the old computer,
- a manual method which is to be used if it is not possible to read the information contained in the old computer.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the battery (see **Battery: Removal - Refitting**) (80A, Battery).



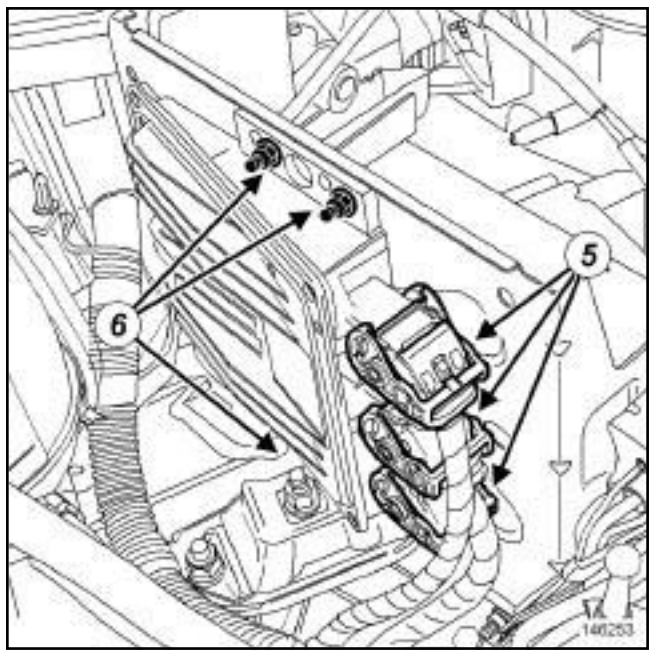
24734

❑ Unclip the positive terminal wiring (**2**) .

❑ Remove:

- the bolts (**3**) from the injection computer protector,
- the injection computer protector (**4**) .

II - REMOVAL OPERATION



146253

❑ Remove the injection computer nuts (**6**) .

❑ Disconnect the three connectors (**5**) from the injection computer.

❑ Remove the injection computer.

K9K

REFITTING

I - REFITTING OPERATION

- ❏ Fit the injection computer on its mounting studs.
- ❏ Torque tighten the **injection computer nuts (8 N.m)**.
- ❏ Connect the injection computer connectors.

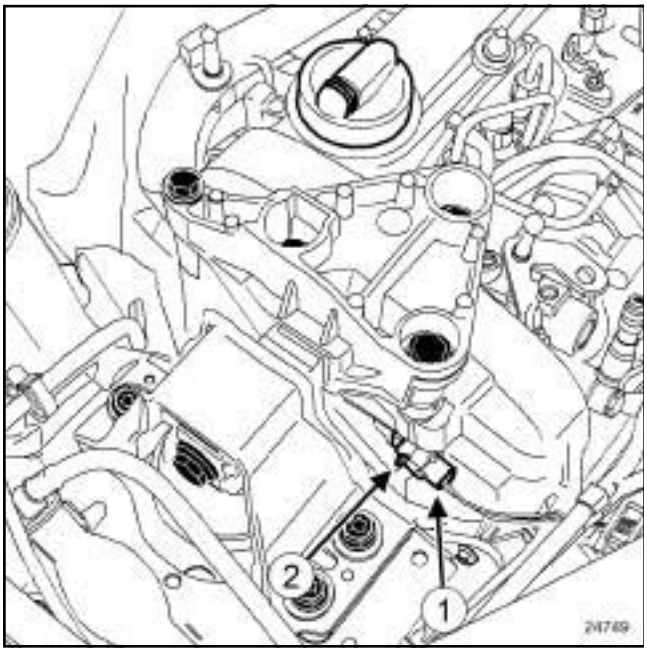
II - FINAL OPERATION

- ❏ Refit the injection computer protector.
- ❏ Tighten to torque the **injection computer protector bolts (8 N.m)**.
- ❏ Clip on the positive terminal wiring.
- ❏ Refit the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❏ Respect the programming settings for the C2I (individual injector correction) parameters and the engine adaptives (see **Fault finding - Replacement of components**) (13B, Diesel injection).
- ❏ Switch on the ignition and read the fault codes using the **Diagnostic tool**.
- ❏ If necessary, repair the faults indicated.
- ❏ Clear the faults.
- ❏ Check that the vehicle is working properly.

K9K

REMOVAL

OPERATION FOR REMOVAL OF PART CONCERNED



24749

❏ Disconnect the connector (**1**) from the camshaft position sensor.

❏ Remove:

- the bolt (**2**) from the camshaft position sensor,
- the camshaft position sensor.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit:

- the camshaft position sensor,
- the camshaft position sensor bolt.

II - FINAL OPERATION

❏ Reconnect the camshaft position sensor connector.

K9K, and 796

Tightening torques ▽	
crankshaft position and speed sensor bolt	**8 N.m**

REMOVAL

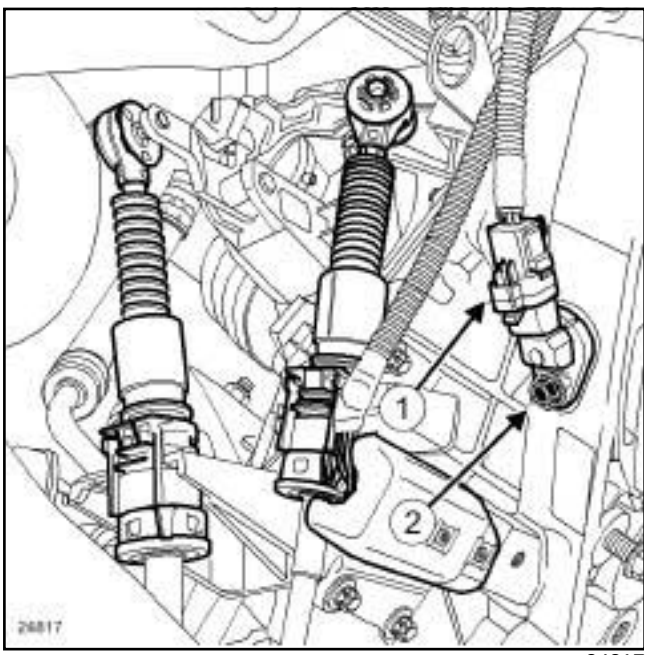
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine undertray bolts,
- the engine undertray.

II - REMOVAL OPERATION



24817

❏ Disconnect the crankshaft position sensor connector (**1**) from underneath the vehicle.

❏ From underneath the vehicle, remove:

- the crankshaft position sensor bolt (**2**) ,
- the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION

❏ Refit the crankshaft position sensor.

❏ Torque tighten the **crankshaft position and speed sensor bolt (8 N.m)**.

❏ Connect the crankshaft position sensor connector.

II - FINAL OPERATION

❏ Refit the engine undertray.

K9K, and 796

Equipment required
Diagnostic tool

Tightening torques ▽	
the high pressure pump bolts	**23 N.m**
high pressure pump pulley nut	**70 N.m**
dipstick guide and filler neck nuts on the high pressure rail	**21 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, use the **Diagnostic tool** to check:

- that the injector rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

Note:

Never run the engine in the opposite direction to that of normal operation.

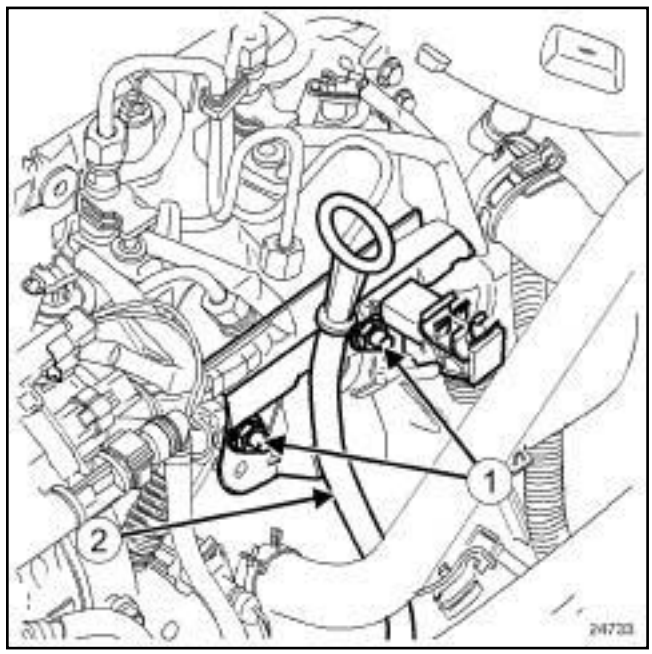
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the front engine cover.

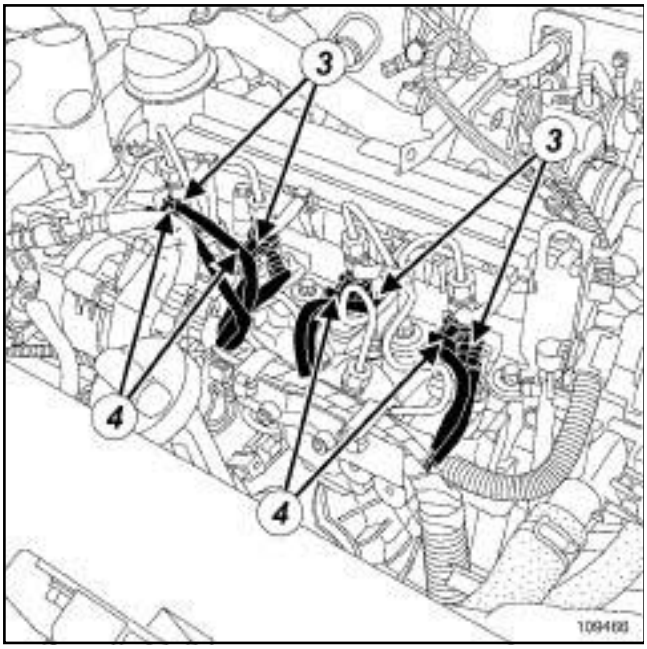


24733

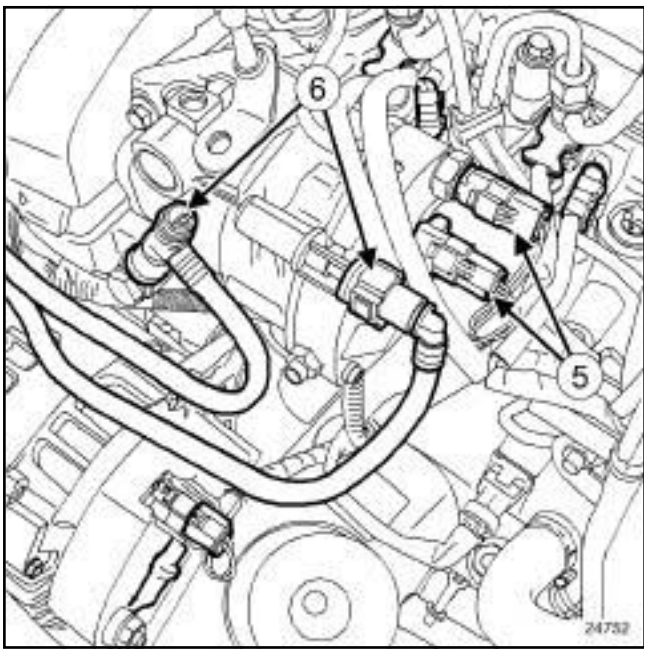
❑ Remove the dipstick guide and filler neck nuts (**1**) .

❑ Put the dipstick guide to one side (**2**) .

K9K, and 796



109466



24752

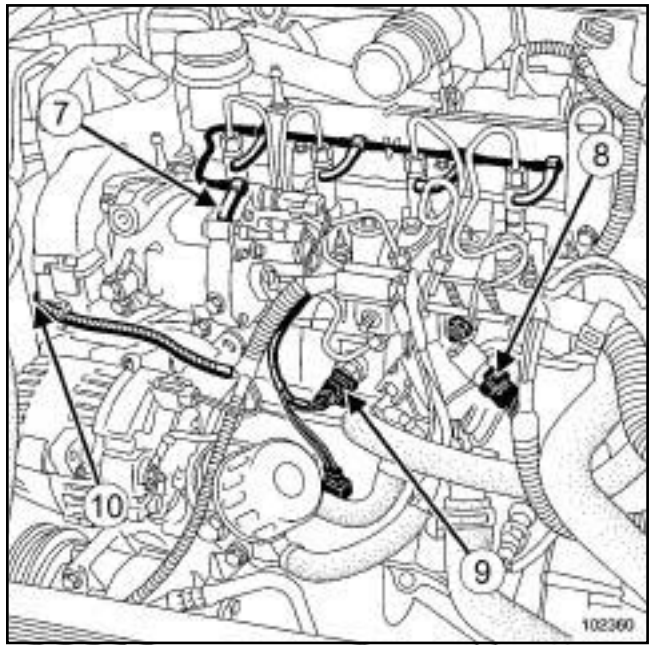
❏ Disconnect:

- the heater plugs (**3**) ,
- the injectors (**4**) ,
- the connectors from the high pressure pump (**5**) .

❏ Clean the diesel supply and return pipes (see **Diesel injection: Precautions for the repair**) .

❏ Disconnect the diesel supply and return pipes (**6**) .

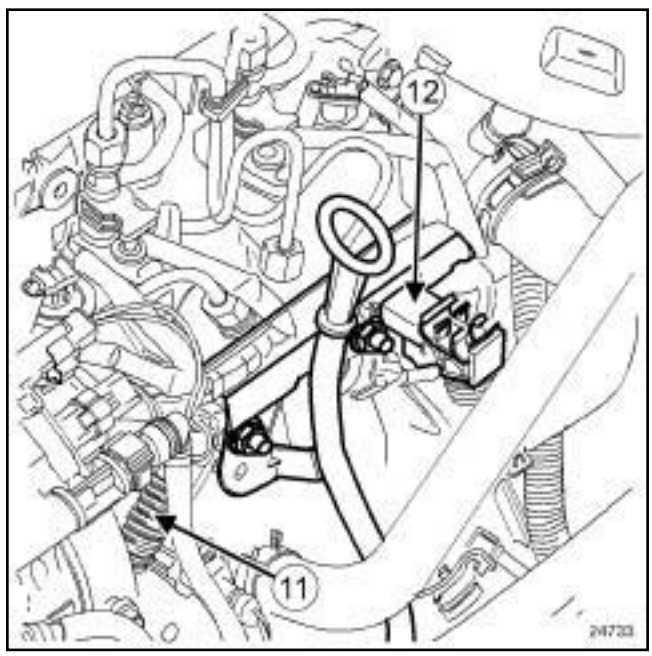
❏ Fit blanking plugs into the openings.



102360

❏ Disconnect:

- the fuel return pipe (**7**) connecting the injectors to the high-pressure pump,
- the injector rail pressure sensor (**8**) ,
- the accelerometer (**9**) ,
- the camshaft position sensor (**10**) .

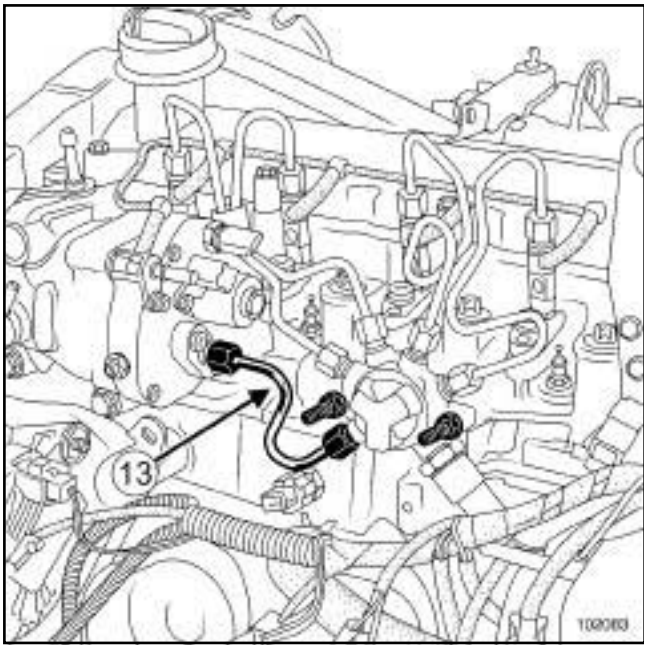


24733

❏ Unclamp the engine wiring (**11**) and move it to one side.

❏ Remove the channel (**12**) located on the injector rail.

K9K, and 796



102083

❏ Remove the high pressure pipe (**13**) between the injector rail and the high pressure pump (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-19**) .

❏ Put blanking plugs in all the openings of the injection circuit.

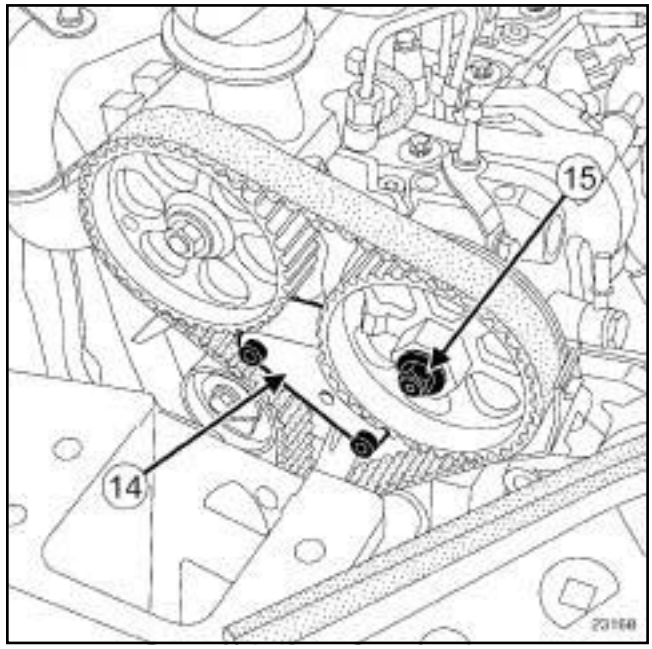
❏ Remove:

- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) .

❏ Remove (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) :

- the upper timing cover,
- the lower timing cover,
- the cylinder head suspended mounting.

❏ Position the engine at top dead centre (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) .



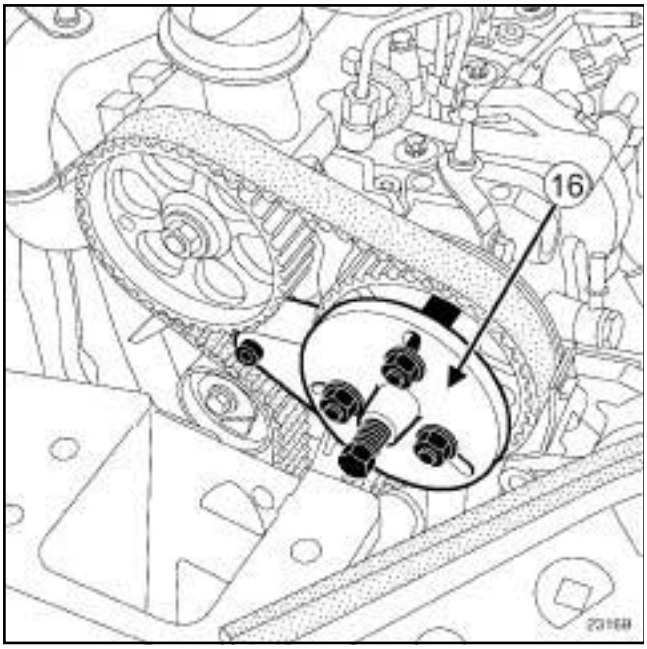
23168

❏ Fit the high pressure pump pulley retaining tool (**14**) .

❏ If necessary, turn the engine slowly to adjust the position of the locking tool on the pump pulley teeth.

❏ Remove the high pressure pump pulley nut (**15**) , holding the pulley with a **32 mm** open-jawed spanner.

K9K, and 796



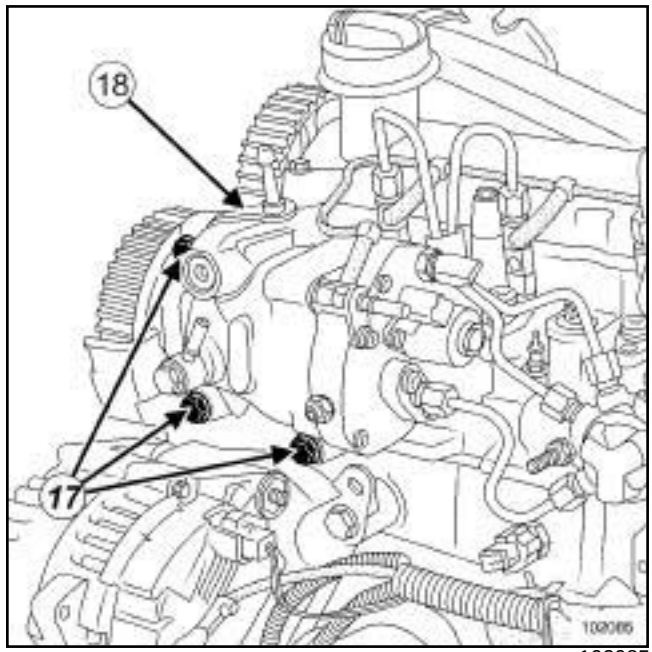
23169

❑ Position the (**16**) fitted with the.

WARNING

Ensure that the tool pushrod is correctly oriented and is pressing against the high pressure pump shaft.

II - REMOVAL OPERATION



102085

❑ Remove:

- the high pressure pump bolts (**17**) ,
- the bracket (**18**) from the engine cover.

❑ Screw the pushrod of the tooluntil the high pressure pump becomes detached.

❑ Remove:

- the high pressure pump,
- the.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check for an index pin on the high pressure pump shaft.

II - REFITTING OPERATION

❑ Refit the high pressure pump on the cylinder head by inserting it into the high pressure pump pulley.

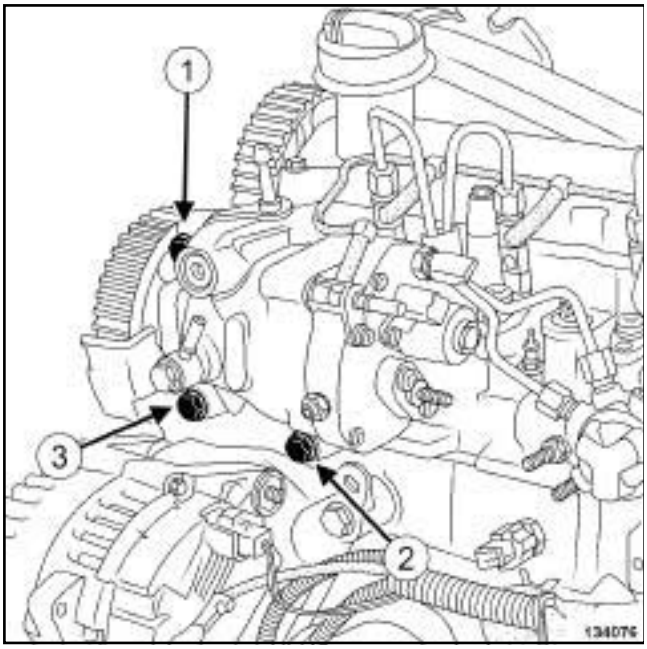
Note:

Check that the high pressure pump shaft is correctly orientated in relation to the high pressure pump pulley.

❑ Refit the engine cover bracket.

❑ Fit the high pressure pump bolts without tightening them.

K9K, and 796



134076

❑ Torque tighten in order **the high pressure pump bolts (23 N.m)**.

❑ Torque tighten the **high pressure pump pulley nut (70 N.m)** while holding the high pressure pump pulley using a **32 mm** spanner.

Note:

Check that the timing belt is correctly positioned and in good condition.

❑ Remove thefrom the cylinder head.

III - FINAL OPERATION

❑ Remove the blanking plugs.

❑ Refit the high pressure pipe between the injector rail and the high pressure pump (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-19**) .

❑ Refit (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) :

- the suspended mounting on the cylinder head,
- the lower timing cover,
- the upper timing cover.

❑ Refit:

- the camshaft position sensor (see **13B**, **Diesel injection**, **Camshaft position sensor: Removal - Refitting**, page **13B-7**) ,
- the right-hand suspended engine mounting (see **19D**, **Engine mounting**, **Right-hand suspended engine mounting: Removal - Refitting**, page **19D-4**) ,
- the neck located on the injector rail.

❑ Secure the engine wiring on the neck.

❑ Connect:

- the camshaft position sensor,
- the accelerometer,
- the injector rail pressure sensor,
- the fuel return pipe connecting the injectors to the high-pressure pump,
- the supply and return pipes on the high pressure pump,
- the connectors to the high pressure pump,
- the injectors,
- the heater plugs.

❑ Refit the dipstick guide.

❑ Torque tighten the **dipstick guide and filler neck nuts on the high pressure rail (21 N.m)**.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Start the engine.

❑ Check that there are no fuel leaks.

❑ Refit the engine cover.

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
flow actuator bolts	**6 N.m**
dipstick guide and filler neck nuts on the high pressure rail	**21 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the injector rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

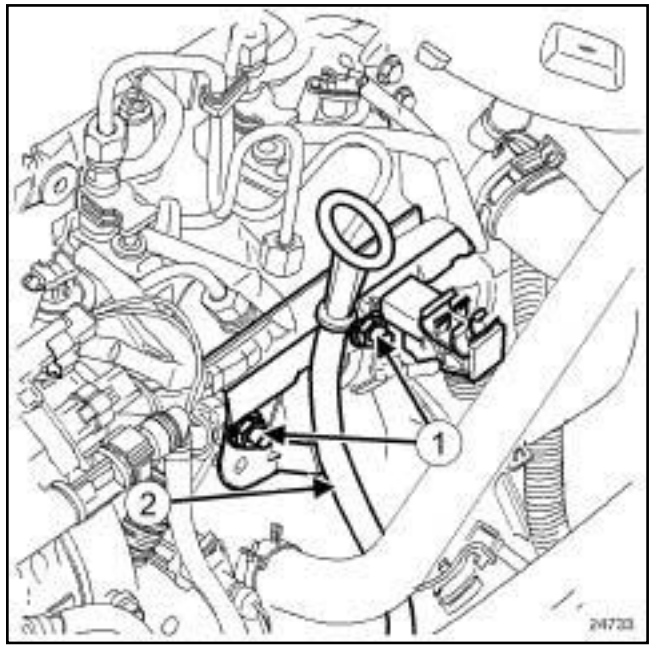
WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

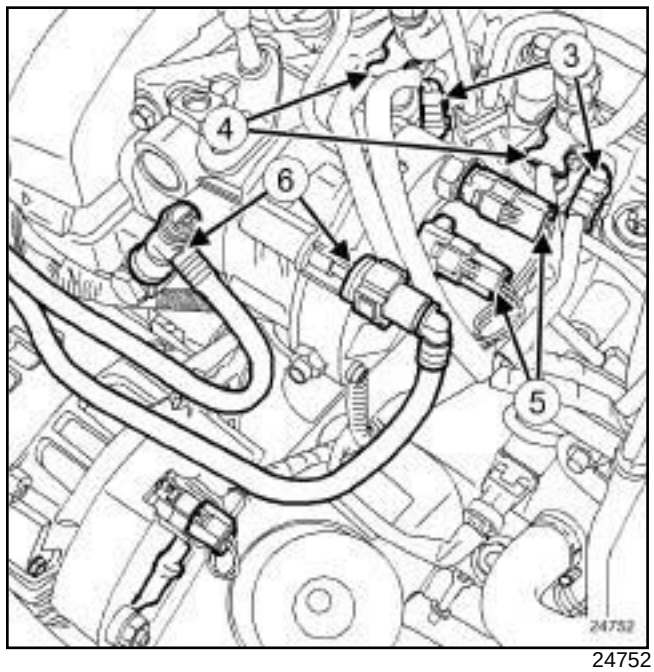
❏ Remove the front engine cover.



24733

❏ Remove the dipstick guide and filler neck nuts (**1**) .

❏ Put the dipstick guide to one side (**2**) .

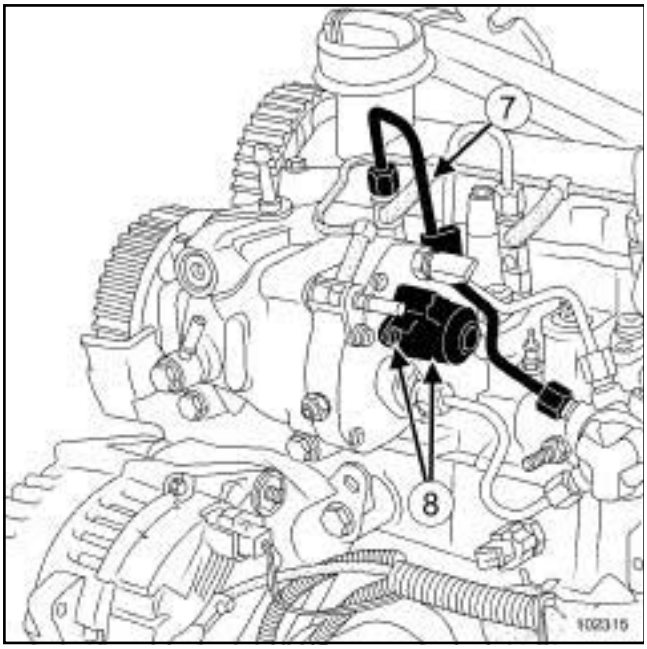


24752

❏ Disconnect:

- the heater plugs (**3**) ,
- the injectors (**4**) ,
- the connectors from the high pressure pump (**5**) ,
- the diesel supply and return pipes (**6**) .

K9K



102315

❑ Disconnect:

- the injector rail pressure sensor,
- the accelerometer .

❑ Unclamp the engine wiring and put it to one side.

❑ Remove:

- the neck located on the injector rail,
- the high pressure pipe (**7**) between the injector rail and injector no. **4** (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) .

❑ Plug the openings.

II - REMOVAL OPERATION

❑ Loosen the fuel flow actuator bolts ***(8)*** .

WARNING
Do not use the electrical connector as a lever arm.

❑ Withdraw the fuel flow actuator (by hand using small successive turns).

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Only unpack the new component when you are ready to fit it.

WARNING
Do not remove the blanking plugs from each component until the last moment.

WARNING
Do not damage the seal when refitting.

Note:
Do not lubricate the seals with grease or old diesel fuel. Use the applicator provided in the kit for the new part.

II - REFITTING OPERATION

❑ Position the flow actuator.

❑ Finger tighten the flow actuator bolts.

❑ Torque tighten the **flow actuator bolts (6 N.m)**.

III - FINAL OPERATION

❑ Refit the new high pressure pipe between the injector rail and injector no. **4** (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) .

❑ Connect:

- the diesel supply and return pipes on the high pressure pump,
- the electrical connectors on the high-pressure pump,
- the injectors,
- the heater plugs.

❑ Refit the dipstick guide.

❑ Torque tighten the **dipstick guide and filler neck nuts on the high pressure rail (21 N.m)**.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Start the engine.

❑ Check that there are no fuel leaks.

❑ Refit the engine cover.

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
Venturi bolt	**6 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the injector rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

Note:

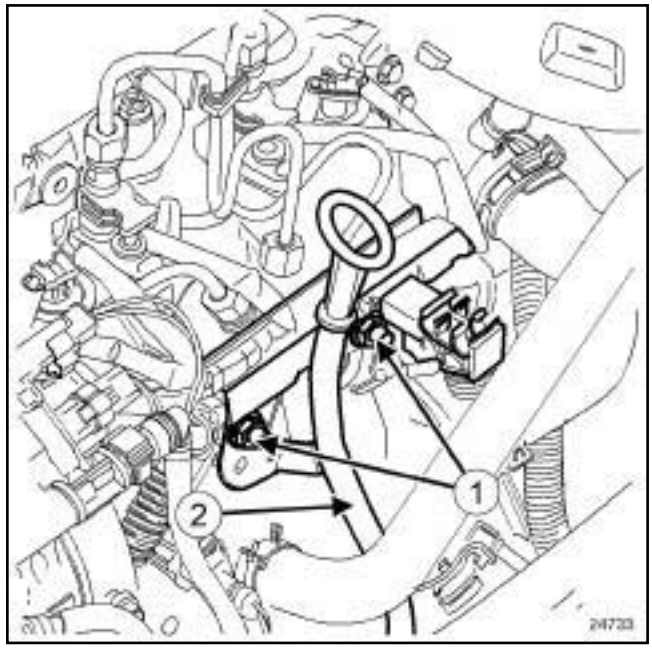
Ensure that you have a new Venturi before opening up the fuel circuit.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

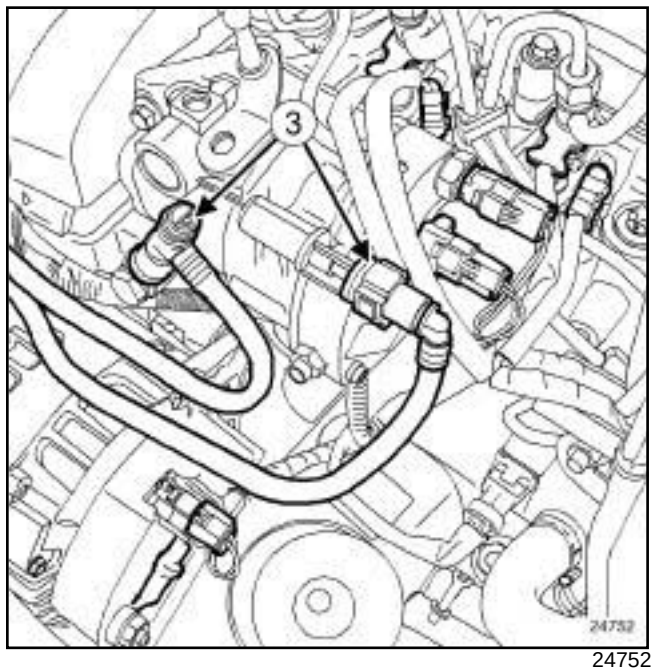
❏ Remove the front engine cover.



24733

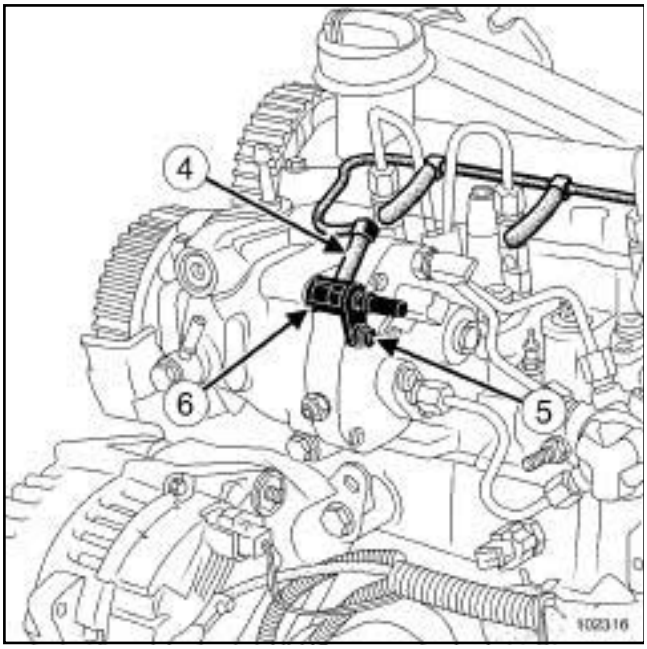
❏ Remove the dipstick guide and filler neck nuts (**1**) .

❏ Put the dipstick guide to one side (**2**) .



24752

❏ Disconnect the diesel supply and return pipes (**3**) .



102316

❏ Disconnect the return pipe (**4**) connecting the injector to the high pressure pump.

II - REMOVAL OPERATION

❏ Remove:

- the bolt ***(5)*** of the Venturi ***(6)*** ,
- the Venturi.

❏ Plug the openings.

REFITTING

I - REFITTING PREPARATION OPERATION

❏

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.

❏ Lubricate the O-ring with lubricant from the applicator supplied with the new part.

II - REFITTING OPERATION

❏ **parts always to be replaced: Venturi**.

> Note:
> Do not damage the seal when refitting.

❏ Fit the Venturi.

❏ Torque tighten the **Venturi bolt (6 N.m)**.

III - FINAL OPERATION

❏ Connect the return pipe connecting the injector to the high-pressure pump.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Start the engine.

❏ Check that there are no fuel leaks.

❏ Refit the engine cover.

K9K

Equipment required
Diagnostic tool

❑

WARNING
Check that there are no diesel leaks after each operation.

Note:

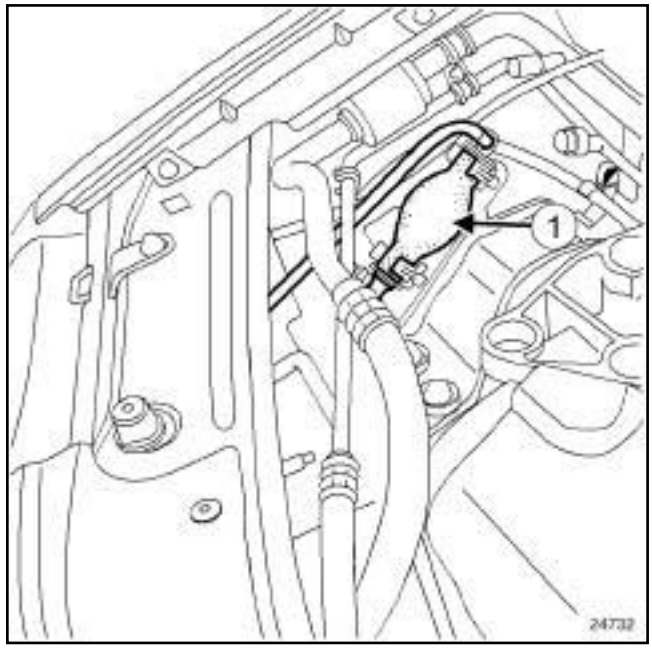
the **Diagnostic tool** can be used for testing the high pressure circuit with the engine running. This command can be used to run fault finding on a leak due to an incorrectly fitted or tightened union. This command only works if the engine coolant temperature is over **60°C**. The fault finding procedure does not reveal small leaks caused by insufficient tightening.

Note:

Respect the repair precautions (see **Diesel injection: Precautions for the repair**) .

CHECK

❑ Remove the front engine cover.



24732

❑ Prime the fuel circuit using the manual priming pump (**1**) until the transparent pipes are filled with fuel (automatic degassing).

❑ Check that there are no fuel leaks.

❑ Connect the **Diagnostic tool** to the vehicle.

❑ Deal with present faults,

Note:

Certain faults will prevent this test from being carried out: deal with them first.

Note:

The engine automatically runs a cycle of four accelerations and decelerations to lower the rail pressure.

WARNING
Do not leave anything on the side of the engine housing during the test phase (significant vibration).

❑ Run command **AC 626 - high pressure circuit sealing test**.

❑ Check that there are no fuel leaks.

❑ Deal with the causes of any possible leaks.

❑ Use the **Diagnostic tool** to check for stored faults; deal with these and clear them as necessary.

❑ Disconnect the **Diagnostic tool**.

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
nut of the high pressure pipe between the pump and the injector rail on the high pressure pump	**28 N.m**
nut of the high pressure pipe between the pump and the rail on the injector rail	**28 N.m**
dipstick guide and filler neck nuts on the high pressure rail	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

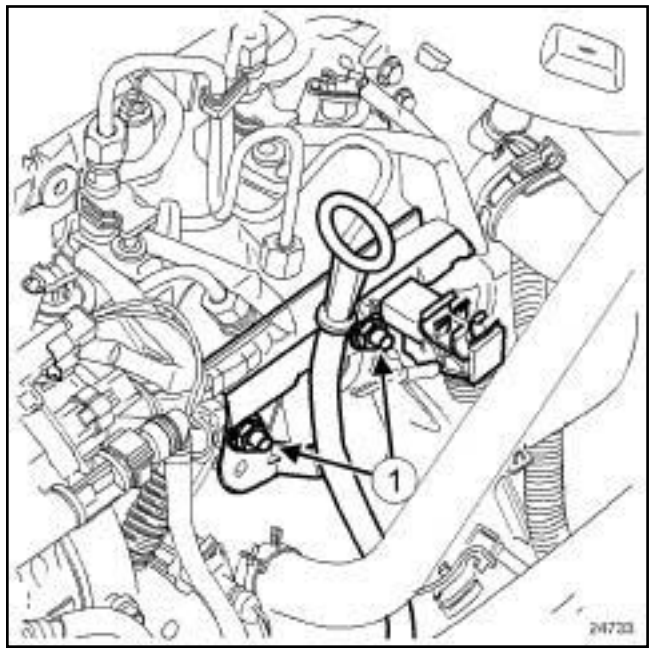
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

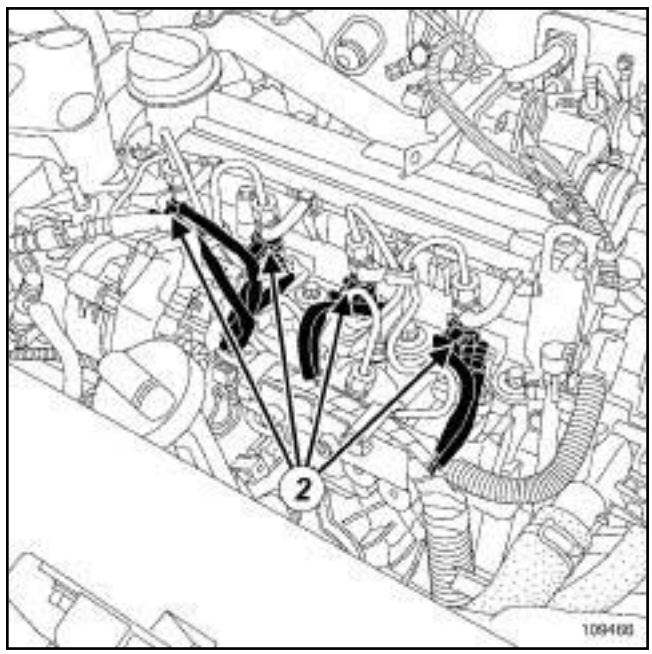
❑ Remove the front engine cover.



24733

❑ Remove the dipstick guide and filler neck bolts (**1**) .

❑ Put the dipstick to one side.

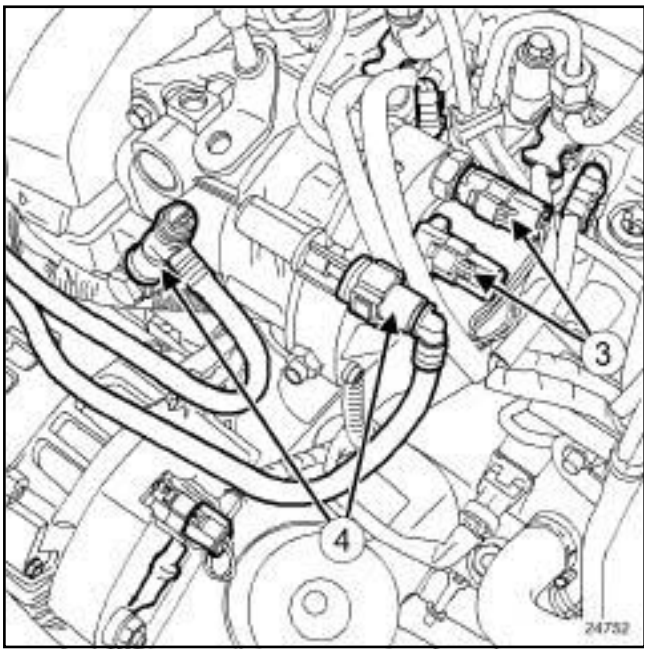


109466

❑ Disconnect the following connectors (**2**) :

- the heater plugs,

- the injectors.



24752

❑ Disconnect:

- the high pressure pump connectors (**3**) .
- the injector rail pressure sensor.

❑ Clean the diesel supply and return pipes (see **Diesel injection: Precautions for the repair**) .

❑ Disconnect the diesel supply and return pipes (**4**) .

❑ Disconnect the return pipe connecting the injectors to the high pressure pump.

❑ Fit the correct blanking plugs.

❑ Move the wiring to one side with the neck on the side.

❑ Clean the high pressure pipe unions between the rail and the injectors (see **Diesel injection: Precautions for the repair**) .

II - REMOVAL OPERATION

❑ Clean the unions of the high pressure pipe between the high pressure pump and the injector rail (see **Diesel injection: Precautions for the repair**) .

❑ Undo:

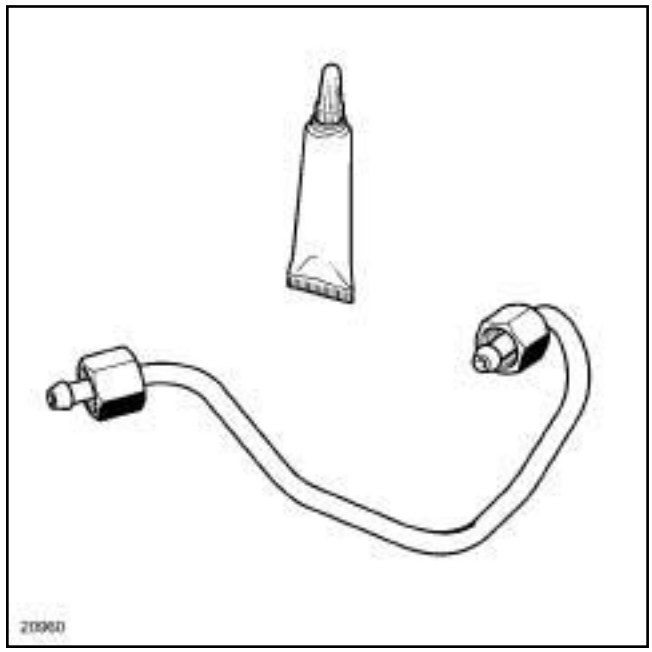
- the high pressure pipe nut at the high pressure pump end,
- the high pressure pipe nut at the injector rail end.

❑ Fit blanking plugs into the openings.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: High pressure pipe between the pump and rail**.



20960

❑

WARNING

Before fitting a new high pressure pipe, lightly lubricate the nut threads with oil from the applicator provided with the new part.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

WARNING

Do not remove the blanking plugs from each component until the last moment.

II - REFITTING OPERATION

❑ Remove the blanking plugs.

❑ Insert the high pressure pipe olive in the high pressure pump high pressure outlet taper.

❑ Insert the high pressure pipe olive into the injector rail inlet taper.

❑ Finger tighten the high-pressure pipe nuts, starting with the one at the injector rail side.

K9K

❏ Slightly pretighten the high pressure pipe nuts.

❏ Torque tighten:

- the **nut of the high pressure pipe between the pump and the injector rail on the high pressure pump (28 N.m)**,
- the **nut of the high pressure pipe between the pump and the rail on the injector rail (28 N.m)**.

III - FINAL OPERATION

❏ Refit the neck on the injector rail.

❏ Connect:

- the injection rail pressure sensor,
- the diesel return pipe connecting the injectors to the high pressure pump,
- the diesel fuel supply and return pipes,
- the high pressure pump electrical connectors.

❏ Connect the connectors of:

- the injectors,
- the heater plugs.

❏ Insert the dipstick.

❏ Refit the dipstick guide.

❏ Torque tighten the **dipstick guide and filler neck nuts on the high pressure rail (21 N.m)**.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Prime the diesel circuit using the priming pump.

❏ Check the high pressure circuit (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-18**) .

❏ Refit the engine cover.

High pressure pipe between rail and injector: Removal - Refitting

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
injector rail nuts	**28 N.m**
« pump - rail» high pressure pipe nuts	**28 N.m**
dipstick guide and filler neck nuts on the high pressure rail	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

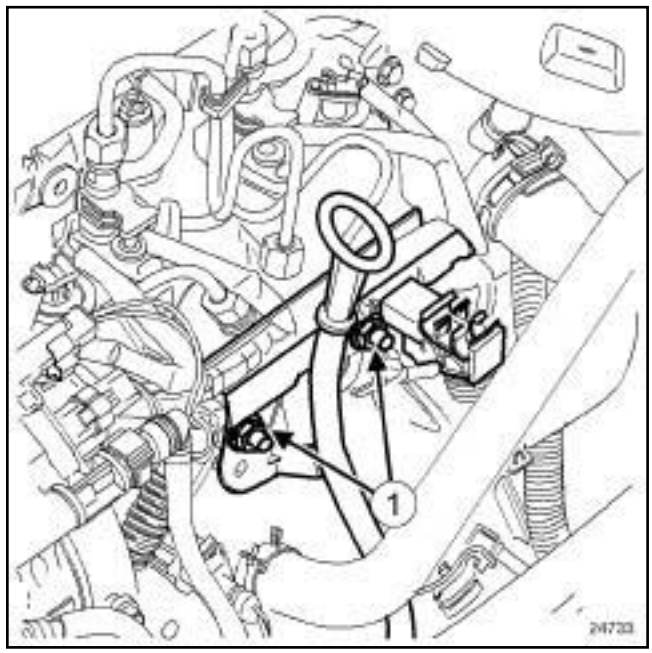
I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .



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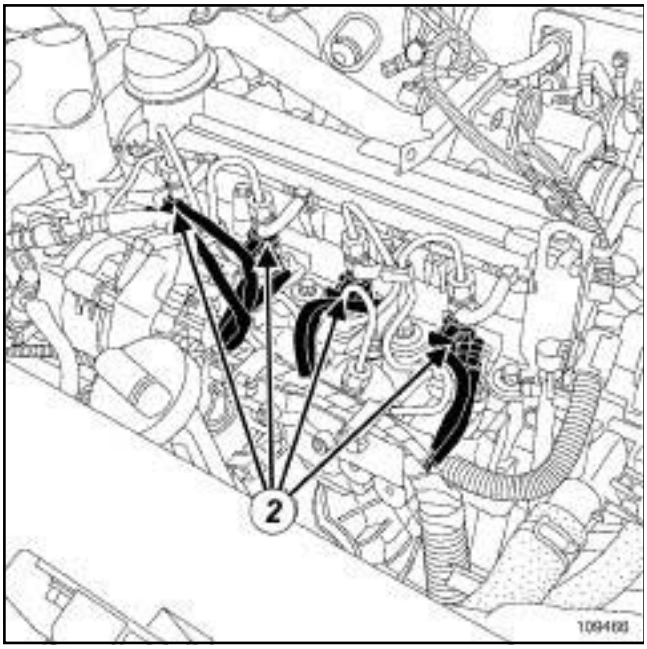
❑ Remove the nuts (**1**) from the dipstick guide and neck.

❑ Put the dipstick to one side.

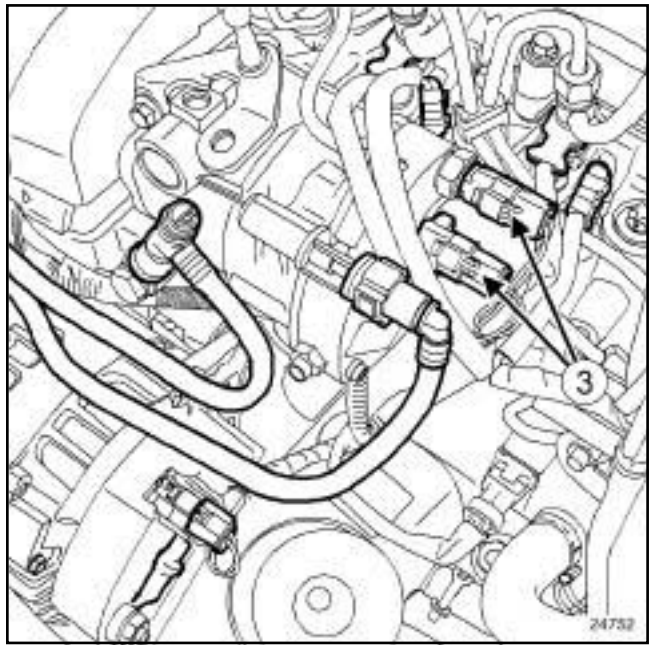
K9K



109466

❏ Disconnect the following connectors (**2**) :

- the heater plugs,
- the injectors.



24752

❏ Disconnect the high pressure pump connectors (**3**) .

❏ Remove the bolts mounting the neck onto the injector rail.

❏ Move the wiring to one side with the neck on the side.

❏ Remove the clips connecting the high pressure pipes.

❏ Clean the high pressure pipe unions between the rail and the injectors (see **Diesel injection: Precautions for the repair**) .

II - REMOVAL OPERATION

❏ Undo:

- the high pressure nut at the injector end,
- the high pressure pipe nut at the injector rail end.

❏ Remove the pipe and discard it.

❏ Fit blanking plugs into the openings.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: High pressure pipe between the rail and injector**.

K9K

20960

❑

WARNING

Before fitting a new high pressure pipe, lightly lubricate the nut threads with oil from the applicator provided with the new part.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

WARNING

Do not remove the blanking plugs from each component until the last moment.

❑ If replacing the four high pressure pipes:

- loosen the injector rail nuts by a few turns (the injector rail should be loose).

II - REFITTING OPERATION

❑ Remove the blanking plugs.

❑ Insert the high pressure pipe olive in the injector high pressure inlet taper.

❑ Position the high pressure pipe olive in the high pressure outlet taper of the injector rail.

❑ Finger tighten the high pressure pipe nuts, starting with the nut at the injector end.

❑ Slightly pretighten the high pressure pipe nuts.

Note:

The assembly order of the « rail-injector » high pressure pipes is not important.

❑ Mount a new clip provided with the new high pressure pipe.

❑ If replacing the four high pressure pipes, torque tighten the **injector rail nuts (28 N.m)**.

❑ Torque tighten in order the **« pump - rail » high pressure pipe nuts (28 N.m)** :

- injectors end,

- on the injector rail end.

Note:

Tighten each pipe fully before moving on to the next pipe.

III - FINAL OPERATION

❑ Refit the neck on the injector rail.

❑ Connect the connectors of:

- the injectors,

- the heater plugs.

❑ Insert the dipstick.

❑ Refit the dipstick guide.

❑ Torque tighten the **dipstick guide and filler neck nuts on the high pressure rail (21 N.m)**.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Prime the diesel circuit using the priming pump.

❑ Check the high pressure circuit (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-18**) .

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

- the engine cover,

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
injector rail nuts	**28 N.m**
nuts of the neck and dipstick guide on the injector rail	**21 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before starting any work on the injection circuit, use the **Diagnostic tool** to check:

- that the injector rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

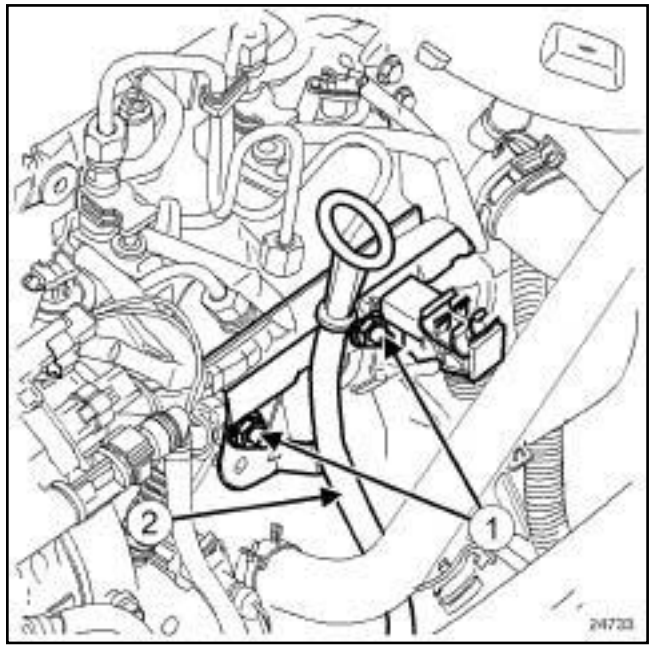
IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the front engine cover.

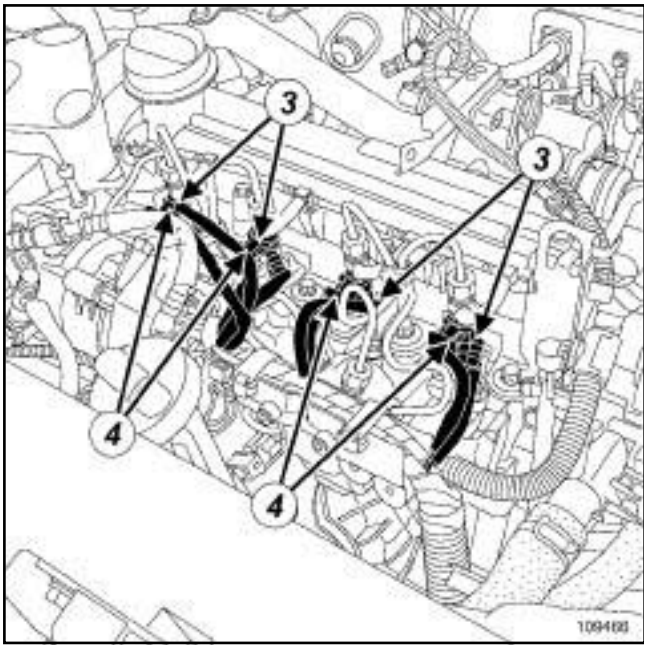


24733

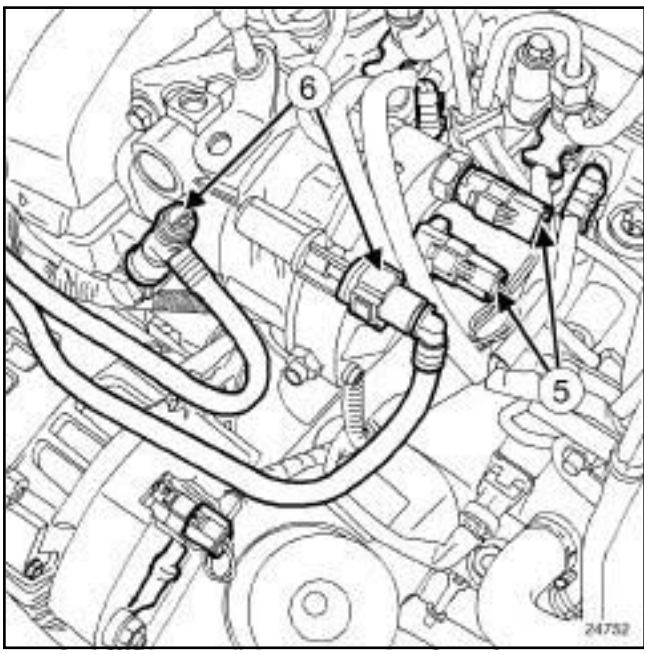
❏ Remove the nuts (**1**) from the dipstick guide and neck.

❏ Put the engine oil dipstick guide to one side (**2**) .

K9K



109466



24752

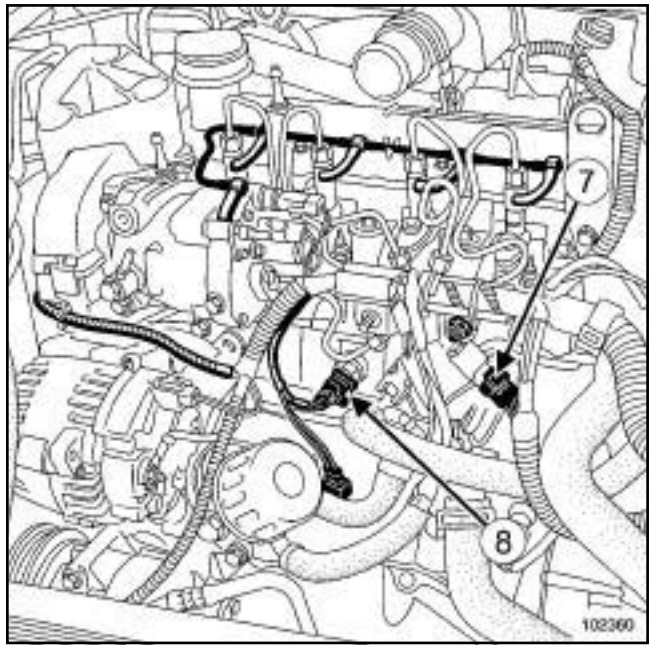
❏ Disconnect:

- the heater plugs (**3**) ,
- the injectors (**4**) ,
- the connectors on the high pressure pump (**5**) ,
- the diesel return pipe connecting the injectors to the high pressure injection pump.

❏ Clean the diesel supply and return pipes (see **Diesel injection: Precautions for the repair**) .

❏ Disconnect the diesel supply and return pipes (**6**) .

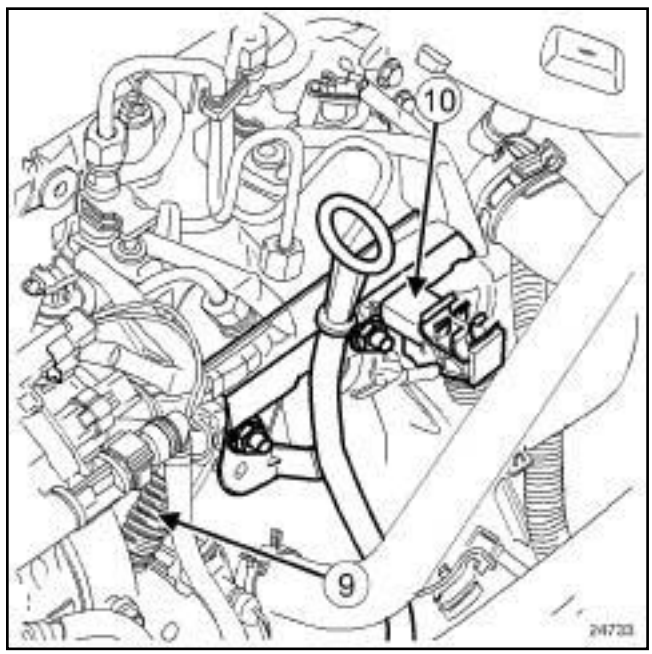
❏ Place blanking plugs on the openings.



102360

❏ Disconnect:

- the pressure sensor (**7**) from the injector rail,
- the accelerometer (**8**) .



24733

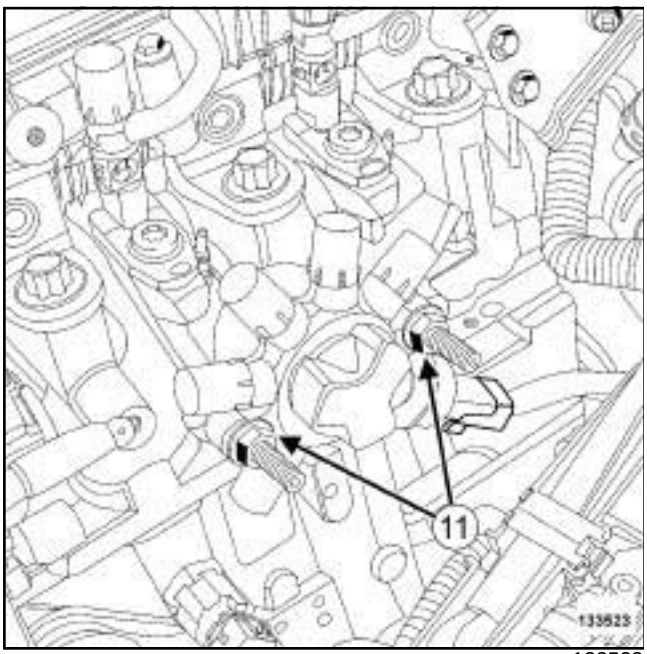
❏ Unclamp the engine wiring (**9**) and place it to one side.

❏ Remove:

- the neck (**10**) located on the spherical injector rail,
- the high pressure pipe between the high pressure pump and the injector rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-19**) ,

- the high pressure pipes between the injector rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



133523

❑ Remove:

- the nuts (**11**) from the injector rail,
- the injector rail.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
> Do not remove the blanking plugs from each component until the last moment.

❑ Fit the injector rail.

❑ Finger tighten the nuts.

❑ Refit:

- the high pressure pipes between the injector rail and the injectors (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) ,
- the high pressure pipe between the high pressure pump and the injector rail (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-19**) .

❑ Torque tighten the **injector rail nuts (28 N.m)**.

II - FINAL OPERATION

❑ Refit the neck located on the injector rail.

❑ Secure the engine wiring on the neck.

❑ Connect:

- the accelerometer,
- the injector rail pressure sensor,
- the diesel return pipe connecting the injectors to the high pressure pump,
- the diesel supply and return pipes on the high pressure pump,
- the connectors to the high pressure pump,
- the injectors,
- the heater plugs.

❑ Refit the dipstick guide.

❑ Torque tighten the **nuts of the neck and dipstick guide on the injector rail (21 N.m)**.

❑ Start the engine.

❑ Check that there are no fuel leaks.

❑ Check the high pressure circuit (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-18**) .

❑ Refit the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
fuel temperature sensor	**15 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

REMOVAL

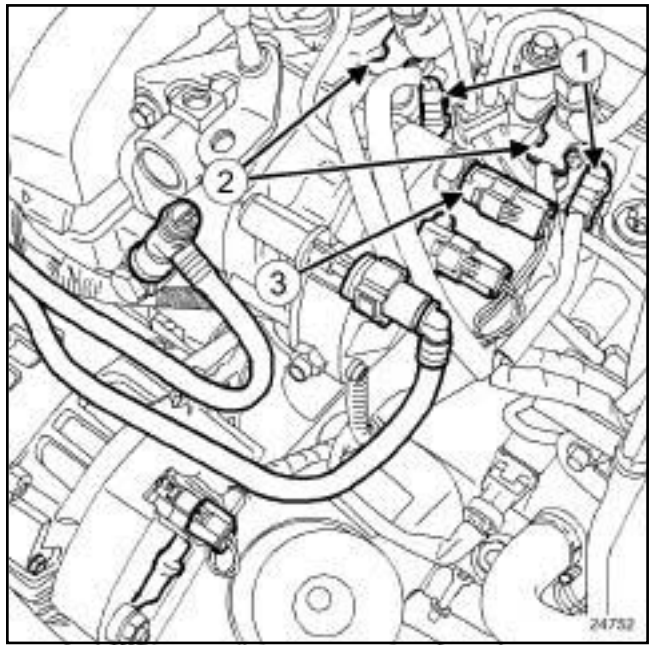
❑

Note:

Make sure you have a new diesel temperature sensor before removal.

I - REMOVAL PREPARATION OPERATION

❑ Remove the front engine cover.



24752

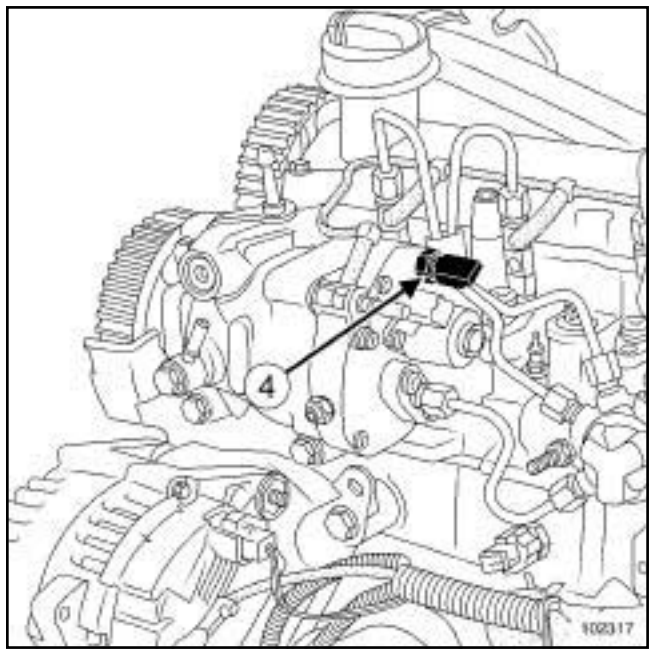
❑ Disconnect:

- the heater plugs (**1**) on cylinders **3** and **4**,

- the injectors (**2**) of cylinders **3** and **4**,

II - REMOVAL OPERATION

❑ Disconnect the fuel temperature sensor connector ***(3)*** .



102317

❑ Clean the fuel temperature sensor.

❑ Remove the fuel temperature sensor (**4**) .

❑ Plug the openings.

K9K

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Lubricate the O-ring with lubricant from the applicator supplied with the new part.

II - REFITTING OPERATION

❑

> Note:
>
> Do not damage the O-ring when refitting.

❑ Remove the blanking plugs.

❑ Fit the fuel temperature sensor.

❑ Torque tighten the **fuel temperature sensor (15 N.m)**.

❑ Connect the connector ***(3)*** of the fuel temperature sensor.

III - FINAL OPERATION

❑ Connect:

- the injectors ***(2)*** of cylinders **3** and **4**,
- the heater plugs ***(1)*** on cylinders **3** and **4**.

❑ Start the engine.

❑ Check that there are no fuel leaks.

❑ Refit the engine cover.

K9K

Equipment required
Diagnostic tool

PARTS AND CONSUMABLES FOR THE REPAIR

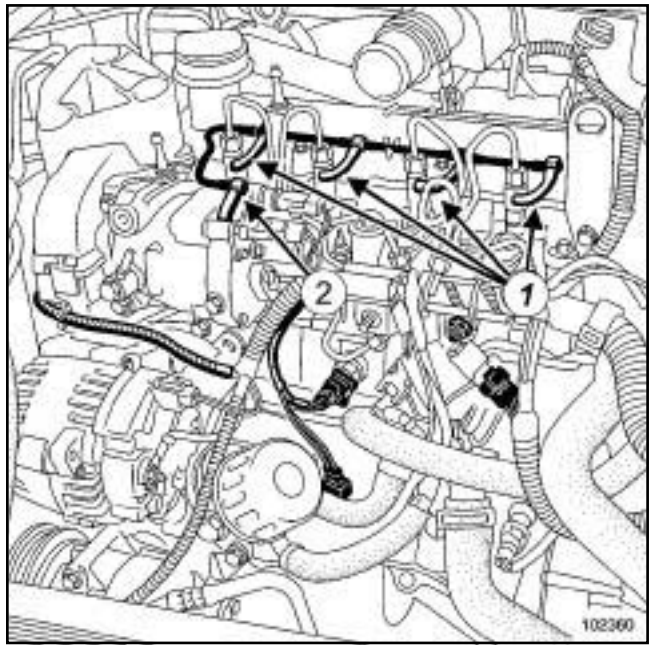
Consumables:

- cleaning cloths (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
- set of K9K blanking plugs (**DELPHI** injection) (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

CHECK

❏ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .



102360

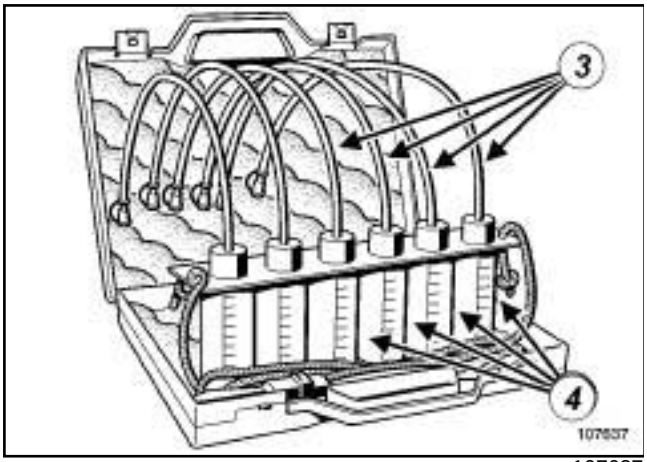
❏ Disconnect:

- the diesel return pipes (**1**) on the injectors,
- the diesel return pipe (**2**) on the venturi attached to the high pressure pump.

Note:
Make preparations for fuel outflow.

❏ Fit the correct blanking plug on the venturi.

Note:
It is essential to fit an appropriate blanking plug to the Venturi to avoid depriming the diesel return circuit.



107637

- ❏ Connect four of the transparent pipes (**3**) of theonto the diesel injector return.
- ❏ Insert these pipes in the four graduated measuring cylinders (**4**) of the.

> Note:
>
> If necessary, attach the graduated measuring cylinder rail of theto the bonnet.

- ❏ Connect the **Diagnostic tool** to the vehicle.
- ❏ Follow the instructions given in test 9: Injector sealing test (see **Fault finding - Test)** (13B, Diesel injection).
- ❏ Disconnect the transparent pipes from the.
- ❏ Remove the transparent pipes from the graduated measuring cylinder of the.
- ❏ Empty the diesel fuel out of the graduated measuring cylinders.
- ❏ Connect:
  - the diesel return pipes on the injectors,
  - the diesel return pipe to the Venturi attached to the high pressure pump.
- ❏ Replace the faulty injector(s) (see **13B**, **Diesel injection**, **Diesel injector: Removal - Refitting**, page **13B-32**) .
- ❏ Check that there are no fuel leaks.
- ❏ Use the **Diagnostic tool** to check for the absence of stored faults, deal with them and clear them, as necessary.
- ❏ Disconnect the **Diagnostic tool**.
- ❏ Refit the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
diesel injector clamp bolt	**28 N.m**
injector rail nuts	**28 N.m**
« rail-injector» high pressure pipe nuts	**24 N.m**
nuts of the neck and dipstick guide on the injector rail	**21 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the injector rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

Injectors may be replaced individually.

REMOVAL

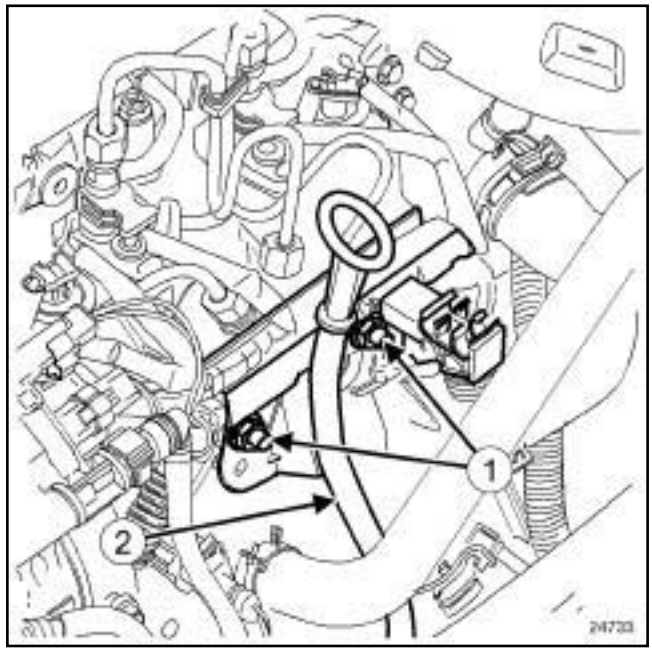
I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

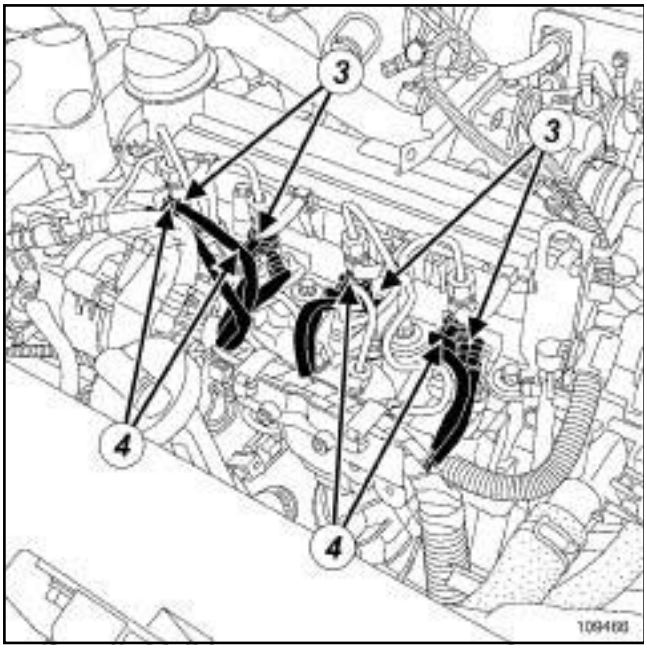


24733

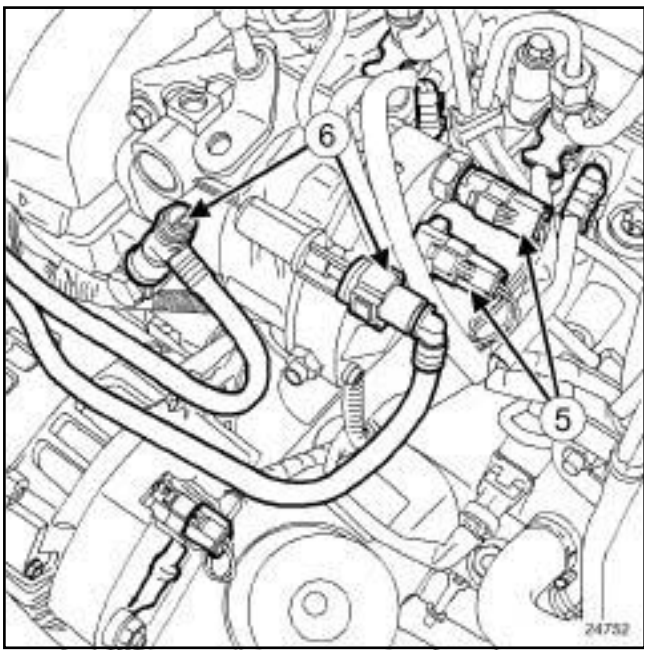
❏ Remove the nuts (**1**) from the dipstick guide and neck.

❏ Put the engine oil dipstick guide to one side (**2**) .

K9K



109466



24752

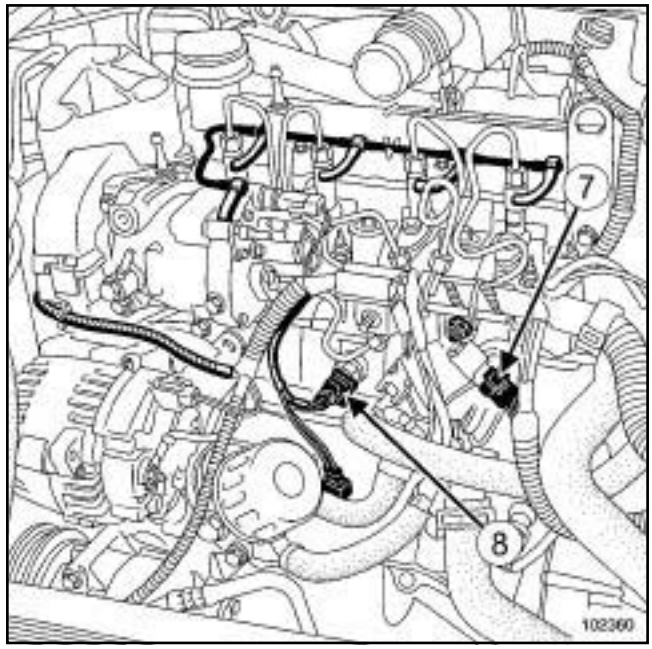
❏ Disconnect:

- the heater plugs (**3**) ,
- the injectors (**4**) ,
- the connectors (**5**) on the high pressure pump,
- the diesel return pipe connecting the injectors to the high pressure injection pump.

❏ Clean the diesel supply and return pipes (see **Diesel injection: Precautions for the repair**) .

❏ Disconnect the diesel supply and return pipes (**6**) .

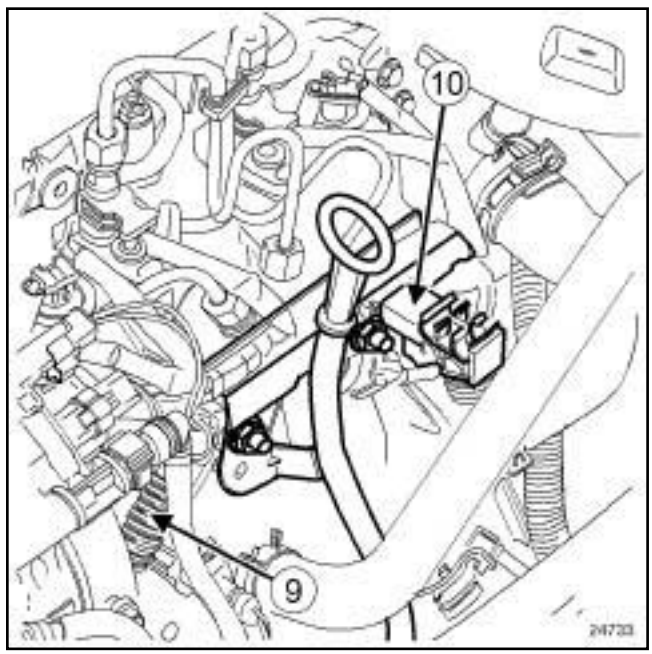
❏ Plug the openings.



102360

❏ Disconnect:

- the pressure sensor (**7**) from the injector rail,
- the accelerometer (**8**) .



24733

❏ Unclamp the engine wiring (**9**) and place it to one side.

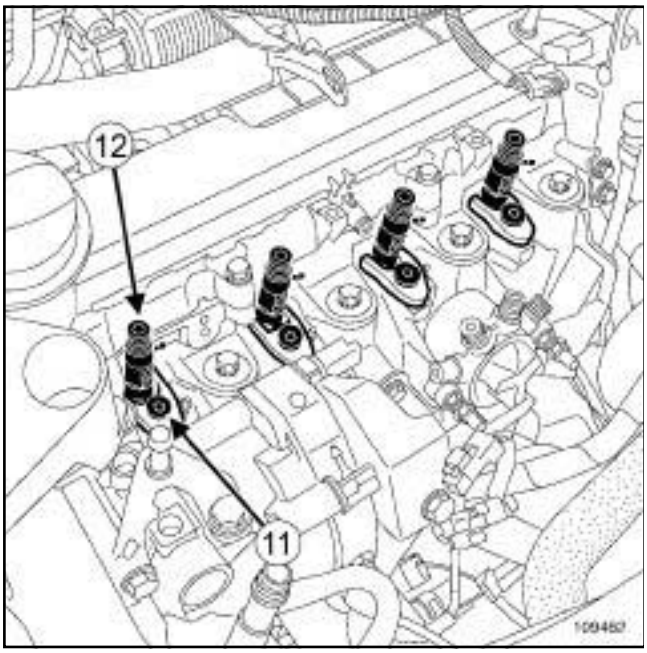
❏ Remove the neck (**10**) located on the injector rail.

❏ Remove the « rail-injector » high pressure pipes (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) .

❏ Plug the openings.

K9K

II - OPERATION FOR REMOVAL OF PART CONCERNED



109462

❏ Loosen the injector clamp bolt (**11**) .

> Note:
>
> If reusing a diesel injector, always mark the removed diesel injector in relation to its cylinder.

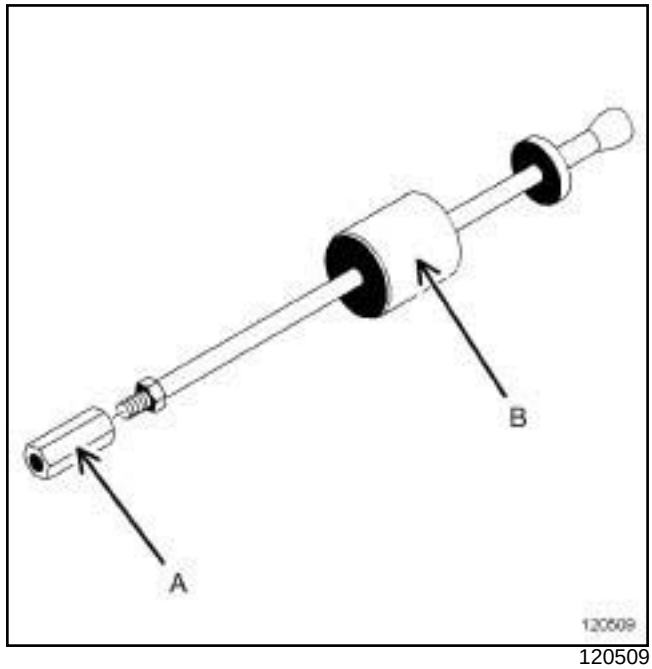
❏ Remove the diesel injector (**12**) .

> Note:
>
> If the diesel injector is jammed, remove the injector using the tooland the tool.

❏ Remove the heat protection washer.

> Note:
>
> If the heat protection washer is stuck at the bottom of the well, use the (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

REMOVING THE INJECTORS USING TOOLS (MOT. 921-01) AND (EMB. 880)



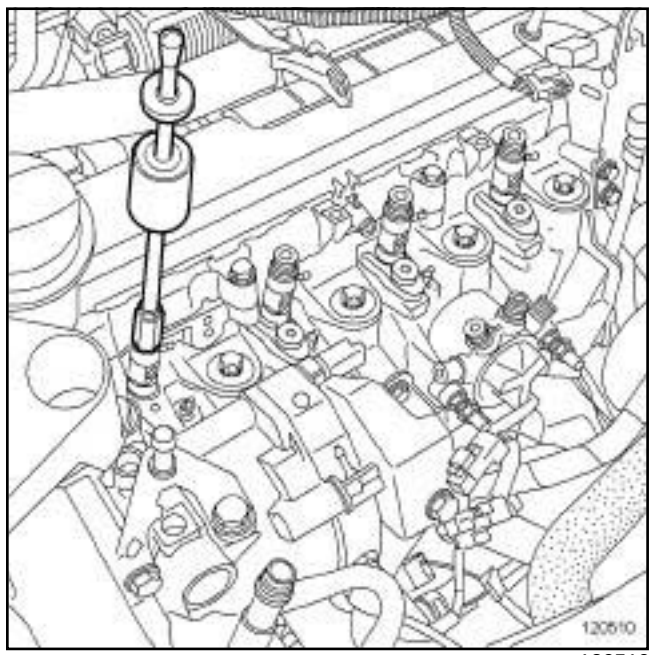
120509

(**A**) Tool for extracting injector holders (Mot. 921-01).

(**B**) Pin extractor (Emb. 880).

❏ Fit the toolon the extractor

❏ Apply releasing agent around the diesel injector.



120510

❏ Fit the slide hammer onto the diesel injector.

❏ Extract the jammed injector using the slide hammer.

K9K

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Always replace the heat protection washer of the diesel injector concerned.

Cleaning parts

❑

> **WARNING**
>
> It is strictly forbidden to clean the injectors with:
>
> - a wire brush,
> - an emery cloth,
> - an ultrasonic cleaner.

❑ Always clean the well of the removed injector (see **Injector well cleaning tool: Use**) (Technical Note 6040A, 13B, Diesel injection).

❑ If reusing the removed injector:

- clean the injector using a **CLOTH FOR INJECTION SYSTEM** soaked in **INJECTOR CLEANER** or **BRAKE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- if necessary, leave the injector nozzle to soak in **INJECTOR CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products),
- wipe the injector with a new **CLOTH FOR INJECTION SYSTEM**, (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) and (see **Diesel injection: Precautions for the repair**) (13B, Diesel injection).

II - REFITTING OPERATION FOR PART CONCERNED

❑

> **WARNING**
>
> Do not remove the caps from each component until the last moment.

> Note:
>
> If one or more injectors are replaced, note the alphanumeric code (C2I) and the cylinder on which it is fitted.

❑ Refit the injector with its clamp.

❑ Torque tighten the **diesel injector clamp bolt (28 N.m)**.

III - FINAL OPERATION

❑ Fit the high pressure pipes (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) .

❑ Torque tighten the **injector rail nuts (28 N.m)**.

❑ Torque tighten in order the **« rail-injector » high pressure pipe nuts (24 N.m)** (see **13B**, **Diesel injection**, **High pressure pipe between rail and injector: Removal - Refitting**, page **13B-22**) .

❑ Refit the neck located on the injector rail.

❑ Secure the engine wiring on the neck.

❑ Connect:

- the accelerometer,
- the high pressure rail pressure sensor,
- the diesel return pipe connecting the injectors to the high pressure pump,
- the diesel supply and return pipes on the high pressure pump,
- the electrical connectors on the high-pressure pump,
- the injectors,
- the heater plugs.

❑ Refit the dipstick guide.

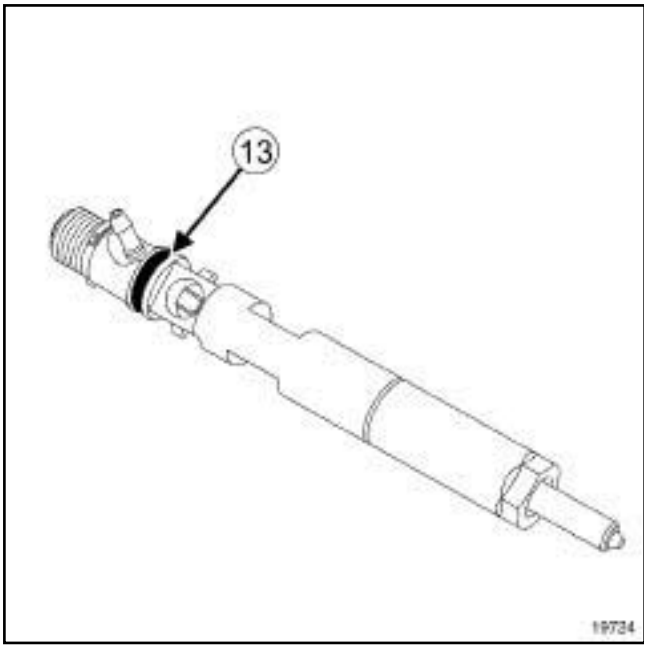
❑ Torque tighten the **nuts of the neck and dipstick guide on the injector rail (21 N.m)**.

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .
- the engine cover,

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K



19724

- ❏ Program the alphanumeric code (C2I) (**13**) for the replaced injector(s) using the **Diagnostic tool** (see **Fault finding - Replacement of components**) (13B, Diesel injection).
- ❏ Start the engine.
- ❏ Check that there are no fuel leaks.

K9K

Equipment required
Diagnostic tool

Tightening torques ▽	
accelerometer	**20 N.m**
dipstick guide and filler neck nuts on the high pressure rail	**21 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Diesel injection: Precautions for the repair**) .

IMPORTANT

Before carrying out any work on the injection system, check using the **Diagnostic tool** :

- that the injector rail is not under pressure,

- that the fuel temperature is not too high.

It is essential to respect the safety and cleanliness advice whenever work is carried out on this system.

Working on the circuit with the engine running is strictly forbidden.

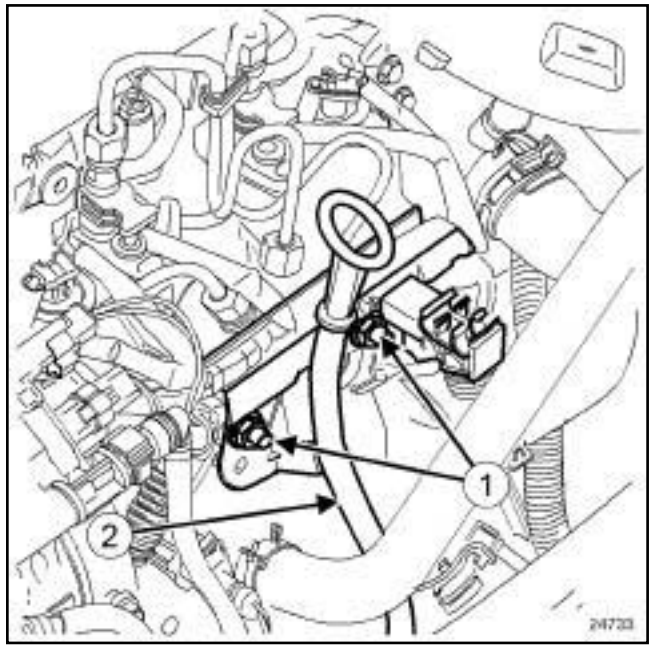
WARNING
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

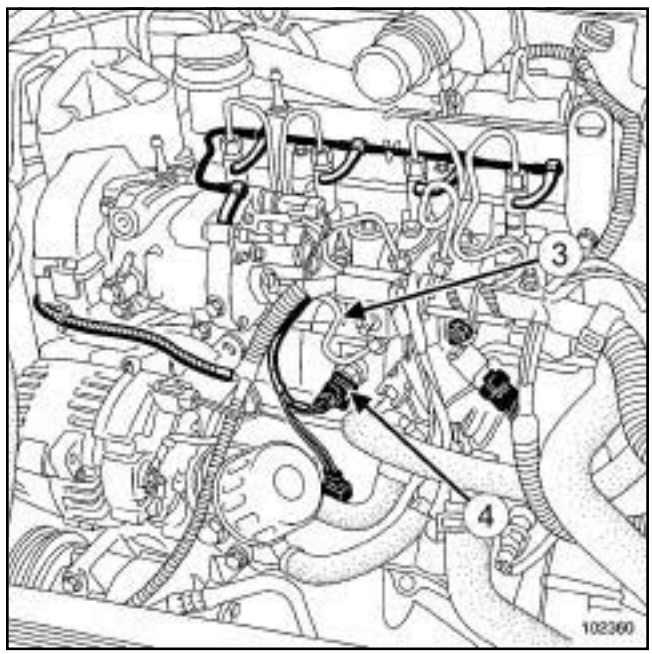
❏ Remove the front engine cover.



24733

❏ Remove the nuts (**1**) from the dipstick guide and neck.

❏ Put the engine oil dipstick guide to one side (**2**) .



102360

❏ Remove the « pump-rail » high pressure pipe (**3**) (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-19**) .

❏ Disconnect the accelerometer connector (**4**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Remove the accelerometer using.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the accelerometer.

❏ Torque tighten the **accelerometer (20 N.m)** using the.

II - FINAL OPERATION

❏ Connect the accelerometer connector.

❏ Refit:

- the « pump-rail » high pressure pipe (see **13B**, **Diesel injection**, **High pressure pipe between pump and rail: Removal - Refitting**, page **13B-19**) ,
- the dipstick guide.

❏ Torque tighten the **dipstick guide and filler neck nuts on the high pressure rail (21 N.m)**.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Program the accelerometer if replaced (see **Fault finding - Interpretation of faults**) (13B, Diesel injection).

> Note:
>
> When replacing the accelerometer, run command **RZ004** using the **Diagnostic tool** in order to carry out the necessary programming.

❏ Check the high pressure circuit (see **13B**, **Diesel injection**, **High pressure pipe: Check**, page **13B-18**) .

❏ Refit the engine cover.

K9K

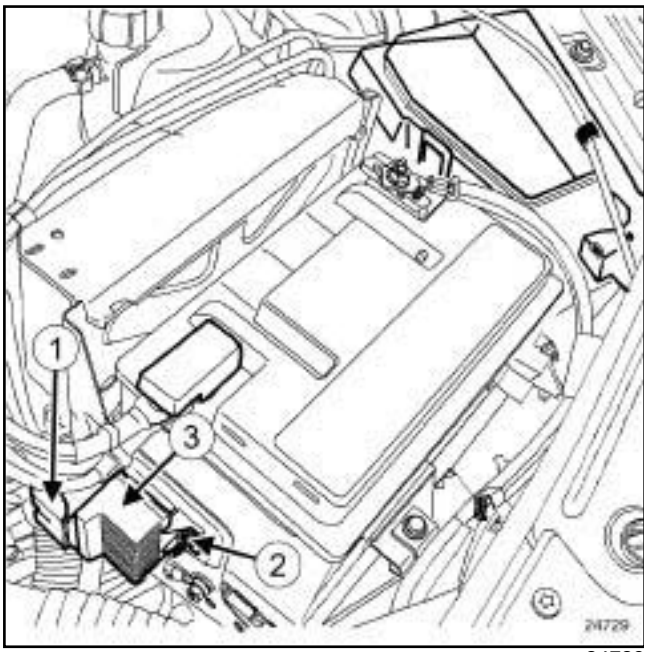
Tightening torques ▽	
pre-postheating unit bolt	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

II - REMOVAL OPERATION



24729

❏ Disconnect the pre-postheating unit connector (**1**) .

❏ Remove:

- the bolt (**2**) from the pre-postheating unit,
- the pre/postheating unit (**3**) .

REFITTING

I - REFITTING OPERATION

❏ Refit the pre-postheating unit.

❏ Tighten to torque the **pre-postheating unit bolt (8 N.m)**.

❏ Connect the pre-postheating unit connector.

II - FINAL OPERATION

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Equipment required
compressed air nozzle
hinged wrench for heater plug

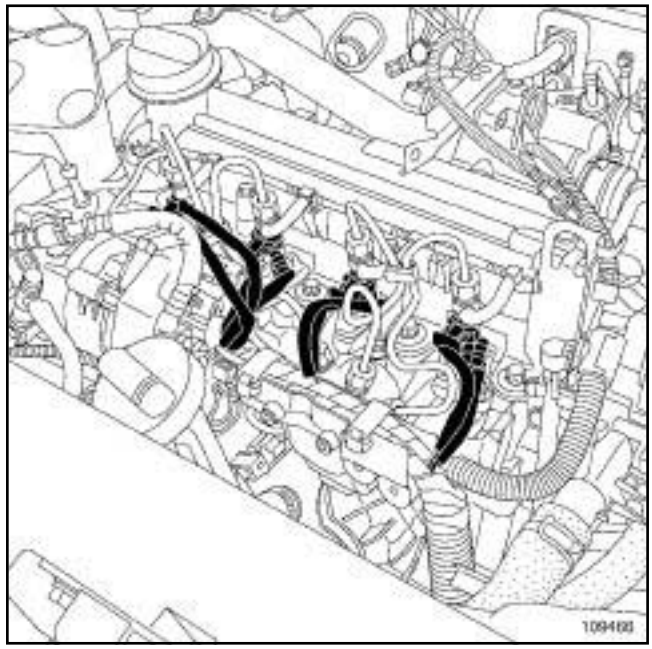
Tightening torques ▽	
heater plugs	**15 N.m**

REMOVAL

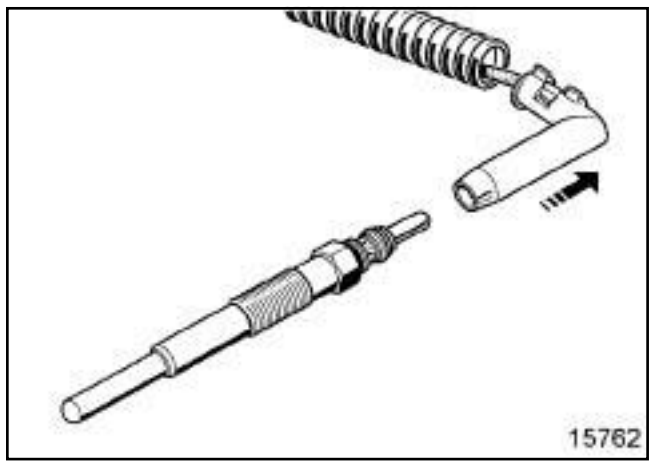
I - REMOVAL PREPARATION STAGE

❏ Remove the front engine cover.

II - REMOVAL OPERATION



109466



15762

❏ Disconnect the connector from each heater plug.

IMPORTANT
Wear goggles with side protectors for this operation.

❏ Clean around the outside of the heater plugs with a **compressed air nozzle** to prevent any impurities from entering the cylinders.

Note:

If the heater plugs jam, use the heater plug removal tool (see) (Technical Note 5197A, 06A, Tools).

K9K

❏ Unscrew the heater plugs using a **10 mm** long socket connected to a universal joint or a **hinged wrench for heater plug**.

❏ Use a hose to unscrew the heater plugs completely.

❏ Remove the heater plugs.

REFITTING

I - REFITTING OPERATION

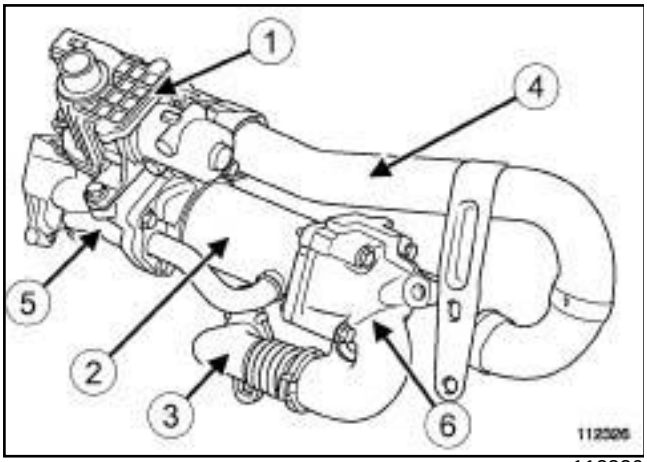
❏ Without tightening, fit the heater plugs using the hose.

❏ Torque tighten the **heater plugs (15 N.m)**.

❏ Connect the connector for each heater plug.

II - FINAL OPERATION

❏ Refit the engine cover.



112326

(**1**) Exhaust gas recirculation solenoid valve

(**2**) Intercooler

(**3**) Exhaust gas inlet pipe

(**4**) Metal air inlet tube

(**5**) Intercooler bracket on the flywheel end

(**6**) Intercooler support on the timing end

K4M

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

Keep the pipe unions away from contaminated areas.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

Note:

The fuel vapour absorber is located behind the front bumper, on the front right-hand side of the vehicle.

REMOVAL

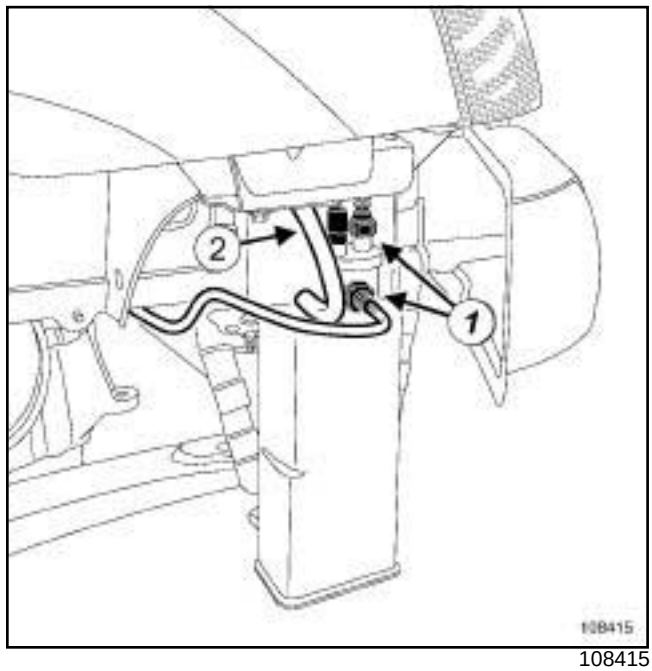
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

❏ Move aside the front section of the front right-hand wheel arch liner.

II - REMOVAL OPERATION



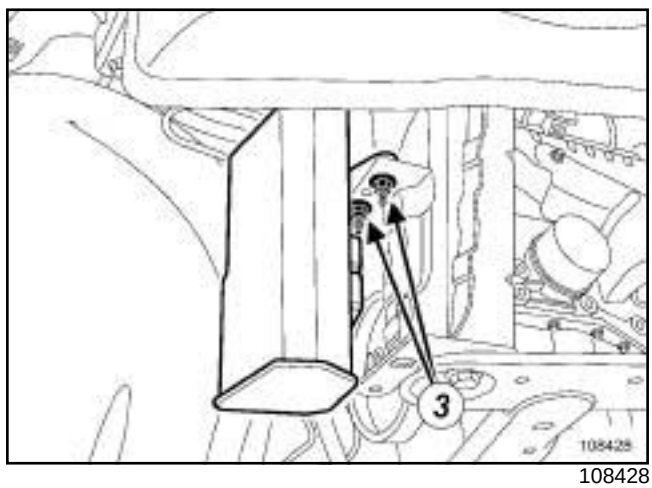
108415

❏ Disconnect:

- the fuel vapour absorber pipes (**1**) ,
- the solenoid valve connector.

❏ Unclip the breather pipe (**2**) .

❏ Insert the blanking plugs.



108428

❏ Remove:

- the fuel vapour absorber nuts (**3**) ,
- the fuel vapour absorber.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Remove the blanking plugs.

II - REFITTING OPERATION

❏ Refit:

- the fuel vapour absorber,
- the fuel vapour absorber nuts.

❏ Clip on the breather pipe ***(2)***

❏ Connect:

- the solenoid valve connector,
- the fuel vapour absorber pipes ***(1)*** .

III - FINAL OPERATION

❏ Fit the front section of the front right-hand wheel arch liner.

❏ Refit the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

K9K, and 796

Tightening torques ▽	
exhaust gas recirculation solenoid valve bolts	**10 N.m**

Note:

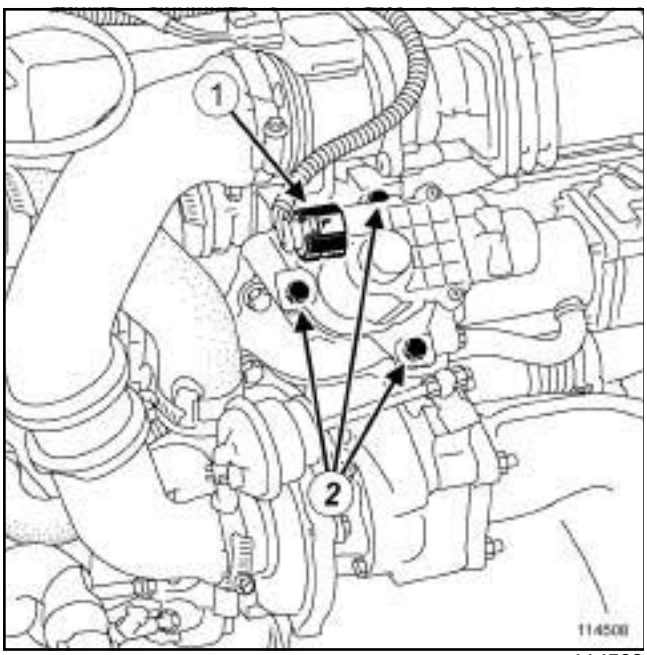
The exhaust gas recirculation solenoid valve is fitted into the exhaust gas recirculation unit.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

II - REMOVAL OPERATION

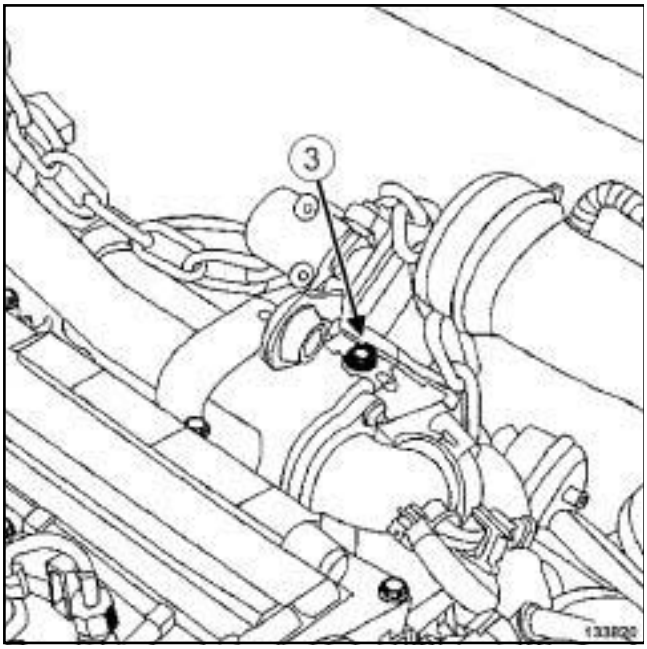


114508

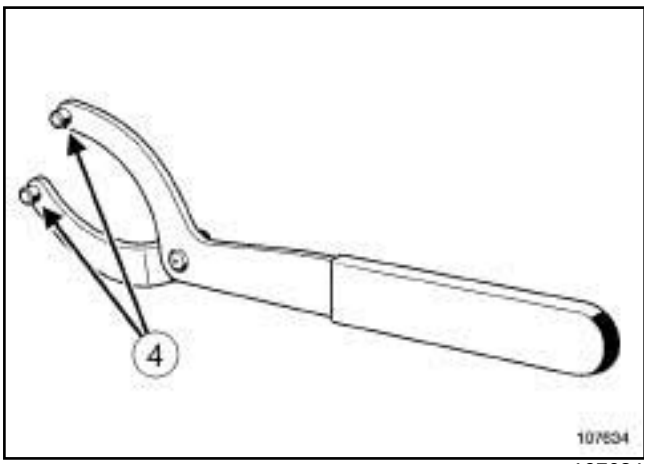
❑ Disconnect the connector (**1**) from the exhaust gas recirculation solenoid valve.

❑ Remove:

- the bolts (**2**) from the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve,
- the exhaust gas recirculation solenoid valve seal.



133820



107634

❑

Note:

Use the toolto detach the exhaust gas recirculation solenoid valves jammed in their exhaust gas cooler mountings on the gearbox end.

Remove:

- the bracket bolt (**3**) from the air filter unit,

- the air filter unit bracket.

Position the lugs (**4**) of the toolin the bracket holes of the exhaust gas recirculation solenoid valve.

Unlock the exhaust gas recirculation solenoid valve by turning it on its axis using the.

Refit:

- the air filter unit bracket,

- the bolt on the air filter unit bracket.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: exhaust gas recirculation solenoid valve seal**.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint face of the exhaust gas recirculation solenoid valve if it is being reused,

- the joint face of the exhaust gas cooler mounting on the gearbox end.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the joint face of the exhaust gas recirculation solenoid valve if it is being reused,

- the joint face of the exhaust gas cooler mounting on the gearbox end.

WARNING

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

II - REFITTING OPERATION

❑ Position the exhaust gas recirculation solenoid valve with a new seal.

K9K, and 796

❑ Torque tighten the **exhaust gas recirculation solenoid valve bolts (10 N.m)**.

❑ Connect the exhaust gas recirculation solenoid valve connector.

III - FINAL OPERATION

❑ Refit the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

K9K, and 796

Tightening torques ▽	
exhaust gas cooler bolts	**12 N.m**
exhaust gas recirculation rigid pipe bolts	**12 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

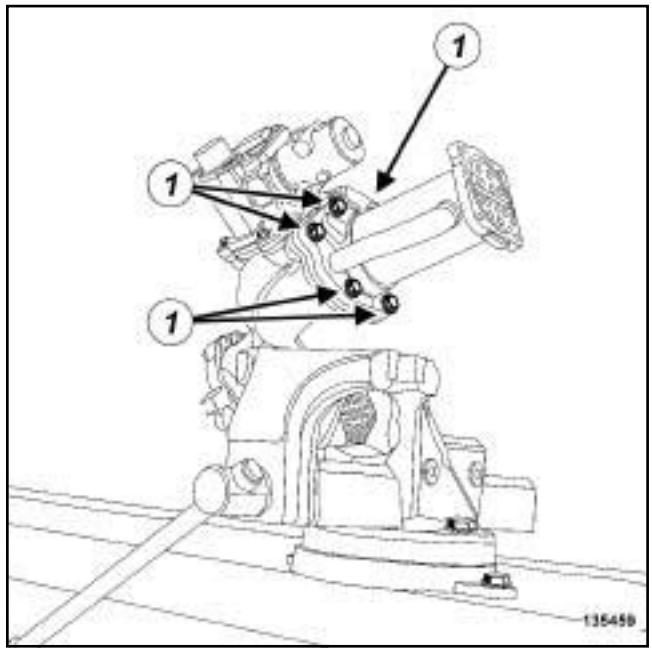
❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) ,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-12**) ,
- the exhaust gas recirculation assembly (see **14A**, **Antipollution**, **Exhaust gas recirculation assembly: Removal - Refitting**, page **14A-9**) .

II - REMOVAL OPERATION



135459

❑ Remove the following on the workbench:

- the exhaust gas cooler bolts (**1**) from the exhaust gas cooler mounting at the gearbox end,
- the exhaust gas cooler from the exhaust gas cooler mounting at the gearbox end,
- the exhaust gas cooler seal at the gearbox end.

REFITTING

I - REMOVAL PREPARATION OPERATION

❑ **parts always to be replaced: exhaust gas cooler seal**

Note:
Take care not to damage the joint faces of the exhaust gas cooler to prevent any coolant leaks.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the joint faces of the exhaust gas cooler if it is to be reused,

K9K, and 796

- the joint face of the exhaust gas cooler mounting on the gearbox end,
- the joint face of the exhaust gas cooler mounting on the timing end.

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the joint faces of the exhaust gas cooler if it is to be reused,
- the joint face of the exhaust gas cooler mounting on the gearbox end,
- the joint face of the exhaust gas cooler mounting on the timing end.

II - REFITTING OPERATION

❑ On the workbench, refit:

- the exhaust gas cooler fitted with a new seal on the exhaust gas cooler mounting at the gearbox end,
- fit without tightening the exhaust gas cooler bolts on the exhaust gas cooler mounting at the gearbox end,
- a new exhaust gas recirculation rigid pipe on the exhaust gas recirculation assembly,
- fit without tightening the bolts of the exhaust gas recirculation rigid pipe on the exhaust gas recirculation assembly.

Note:

The exhaust gas cooler must be able to move in relation to the exhaust gas cooler mounting and the exhaust gas recirculation rigid pipe so that it can be adjusted correctly.

❑ Fit the exhaust gas recirculation assembly equipped with the exhaust gas recirculation rigid pipe on the cylinder head.

❑ Tighten:

- the bolts of the exhaust gas recirculation assembly on the cylinder head,
- the bolts of the exhaust gas recirculation rigid pipe bracket on the cylinder head,
- the bolts of the exhaust gas cooler on the exhaust gas recirculation mounting,
- the bolts of the exhaust gas recirculation rigid pipe on the exhaust gas recirculation assembly,

❑ Remove:

- the exhaust gas recirculation assembly bolts,
- the bolts of the exhaust gas recirculation rigid pipe bracket,
- the exhaust gas recirculation assembly fitted with the exhaust gas recirculation rigid pipe.

❑ On the workbench, torque tighten:

- the **exhaust gas cooler bolts (12 N.m)**,
- the **exhaust gas recirculation rigid pipe bolts (12 N.m)**.

III - FINAL OPERATION

❑ Proceed in the reverse order to removal.

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K9K, and 796

Special tooling required	
Ms. 583	Pipe clamps.

Tightening torques ▽	
bolts of the exhaust gas recirculation assembly	**21 N.m**
bolts on the « timing end lifting eye - air inlet metal tube assembly »	**10 N.m**

IMPORTANT
Wear cut-resistant gloves during the operation.

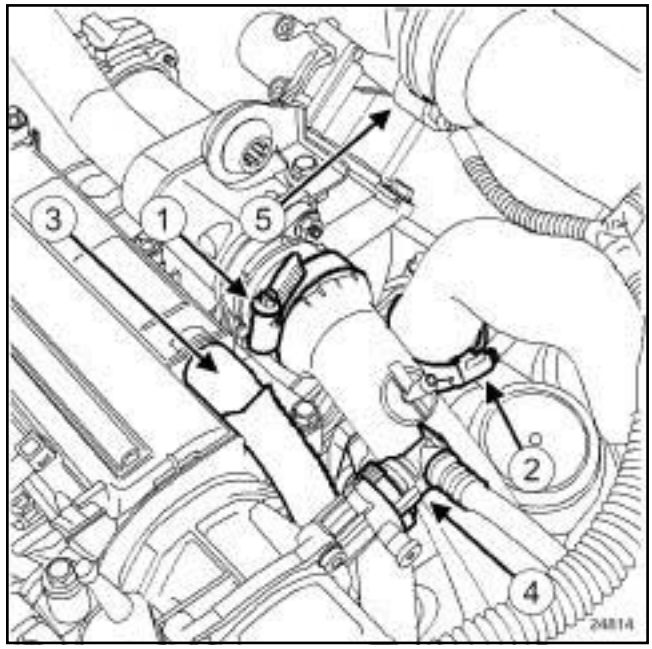
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the air filter box (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine undertray,
- the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .



24814

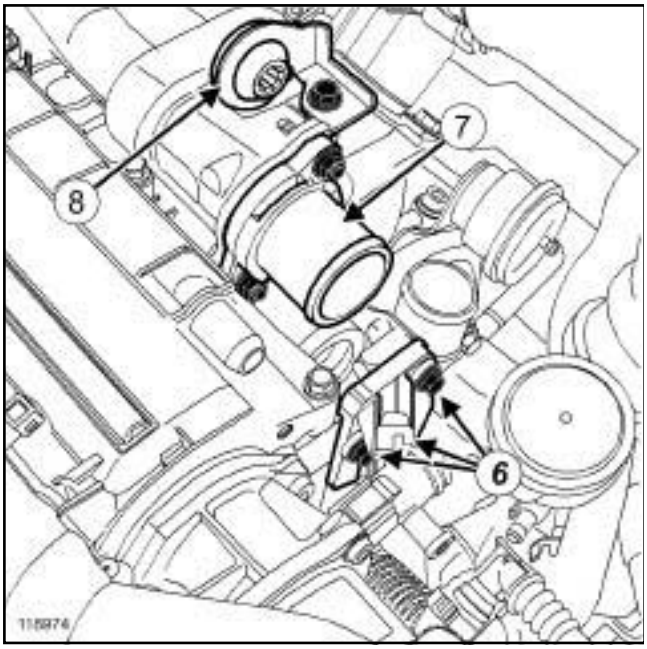
❏ Remove:

- the clip (**1**) on the air pipe between the intercooler and the exhaust gas recirculation assembly,
- the clip (**2**) on the air pipe between the intercooler and the turbocharger.

❏ Disconnect:

- the air pipe between the intercooler and the exhaust gas recirculation assembly,
- the air pipe between the intercooler and the turbocharger,
- the oil vapour rebreathing pipe (**3**) ,
- the non-return valve (**4**) at the vacuum pump,
- the exhaust gas recirculation solenoid valve connector (**5**) .

K9K, and 796



118974

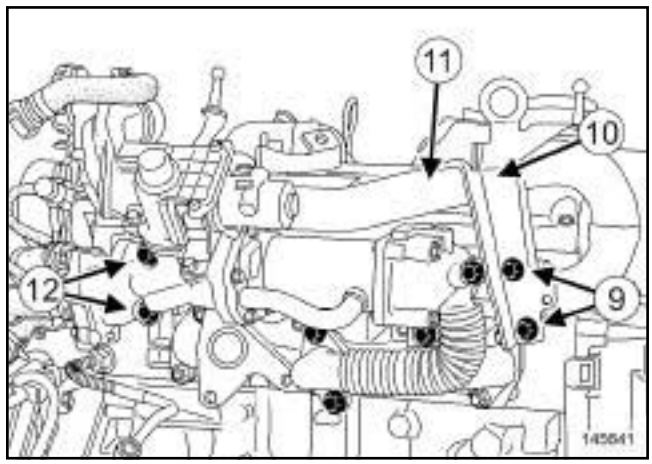
❑ Position the **(Ms. 583)** or the hose clamps on the coolant inlet and outlet hoses of the exhaust gas cooler.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

❑ Remove:

- the bolts (**6**) on the coolant circulation cover,
- the coolant circulation cover,
- the seals of the coolant circulation cover.

II - REMOVAL OPERATION



145641

❑ Remove:

- the bolts (**9**) from the lifting eye at the timing end,
- the lifting eye on the timing end (**10**) ,
- the air inlet metal tube (**11**) ,
- the air inlet metal tube seals,
- the exhaust gas recirculation rigid pipe (see **14A**, **Antipollution**, **Exhaust gas recirculation rigid pipe: Removal - Refitting**, page **14A-12**) ,
- the bolts (**12**) of the exhaust gas assembly mounting,
- the exhaust gas recirculation assembly.

❑ Remove the following on the workbench:

- the air duct sleeve ***(7)*** ,
- the centring ring ***(8)*** of the air filter unit.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ On the workbench, refit:

- the air pipe sleeve ***(7)*** ,
- the centring ring of the air filter unit.

❑ Always replace:

- the air inlet metal tube seals,
- the coolant circulation cover seals,
- the turbocharger air outlet pipe seal.

K9K, and 796

❏ Use **GREY ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint faces of the exhaust gas cooler mounting at the gearbox end.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the housing of the coolant circulation cover seals,
- the exhaust gas cooler mounting joint faces on the gearbox end,
- the housing of each air inlet metal tube seal,
- the housing of the turbocharger air outlet pipe seal,
- the housing of the air inlet metal tube in the cylinder head,
- the housing of the air inlet metal tube in the exhaust gas cooler mounting on the gearbox end.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

II - REFITTING OPERATION

❏ Proceed in the reverse order to removal.

❏ Torque tighten:

- the **bolts of the exhaust gas recirculation assembly (21 N.m)**,
- the **bolts on the « timing end lifting eye - air inlet metal tube assembly » (10 N.m)**.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K9K, and 796

Tightening torques ▽	
bolts of the exhaust gas recirculation rigid pipe bracket on the cylinder head	**21 N.m**
bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold	**36 N.m**
bolts of the exhaust gas recirculation rigid pipe on the exhaust gas recirculation assembly	**12 N.m**
lifting eye bolts	**10 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

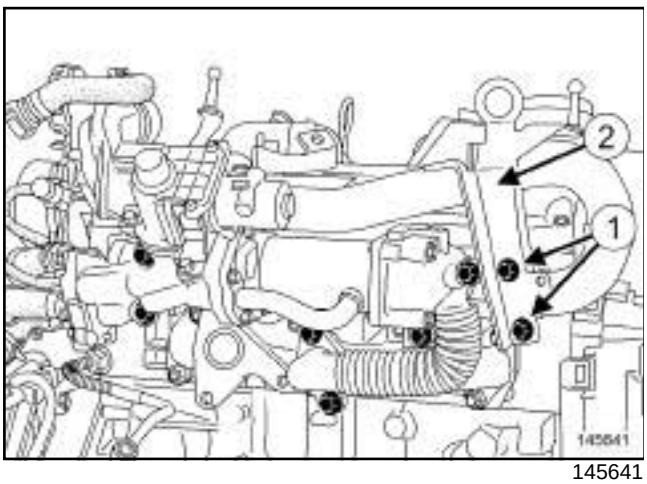
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine undertray.

❏ Remove the catalytic converter (see **19B**, **Exhaust**, **Catalytic converter: Removal - Refitting**, page **19B-10**) .

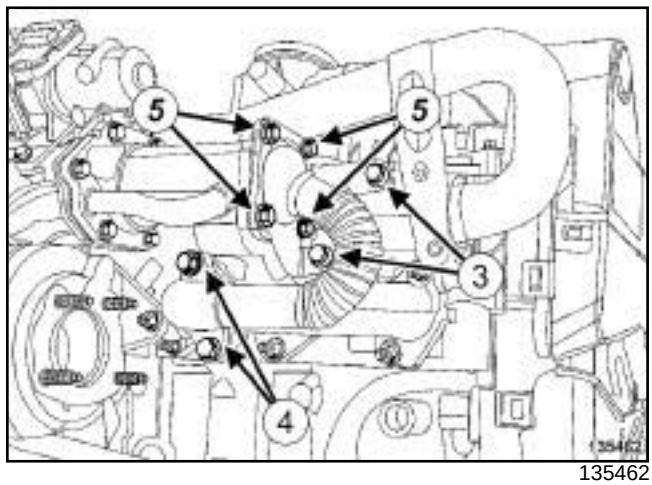


145641

❏ Remove:

- the bolts (**1**) from the lifting eye at the timing end,
- the timing end lifting eye (**2**) ,

II - REMOVAL OPERATION



135462

❏ Remove:

- the bolts (**3**) of the exhaust gas recirculation rigid pipe bracket from the cylinder head,
- the bolts (**4**) of the exhaust gas recirculation rigid pipe from the exhaust manifold,
- the bolts (**5**) of the exhaust gas recirculation rigid pipe from the exhaust gas recirculation rigid pipe,
- the exhaust gas recirculation rigid pipe,
- the seal between the exhaust gas rigid pipe and the exhaust gas manifold,
- the seal between the exhaust gas recirculation rigid pipe and the exhaust gas cooler.

REFITTING

I - REFITTING PREPARATION OPERATION

❏

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

K9K, and 796

❏ Clean using **ABRASIVE PADS** :

- the joint face of the exhaust gas recirculation assembly,
- the exhaust manifold seal face.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❏ Use **SURFACE CLEANER** (see) (04B, Consumables - Products) and **CLEAN CLOTHS** to degrease:

- the exhaust manifold joint face,
- the joint face of the exhaust gas recirculation assembly.

❏ **parts always to be replaced: Exhaust gas recirculation rigid pipe**.

❏ **parts always to be replaced: Exhaust gas recirculation pipe seal**.

❏ **parts always to be replaced: exhaust gas recirculation pipe bolt**

II - REFITTING OPERATION

❏ Proceed in the reverse order to removal.

❏ Torque tighten:

- the **bolts of the exhaust gas recirculation rigid pipe bracket on the cylinder head (21 N.m)**,
- the **bolts of the exhaust gas recirculation rigid pipe on the exhaust manifold (36 N.m)**,
- the **bolts of the exhaust gas recirculation rigid pipe on the exhaust gas recirculation assembly (12 N.m)**,
- the **lifting eye bolts (10 N.m)**.

K9K

Tightening torques ▽	
alternator bolts	**21 N.m**
alternator lead nut	**14 N.m**

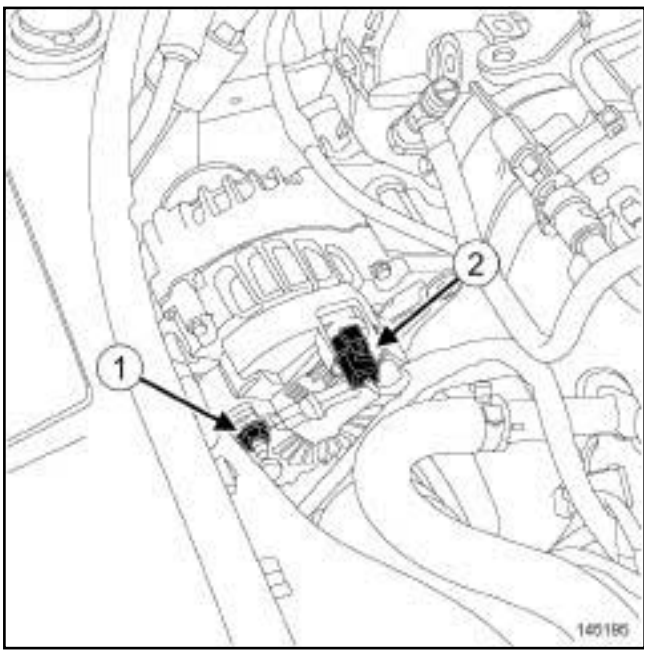
REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

II - REMOVAL OPERATION

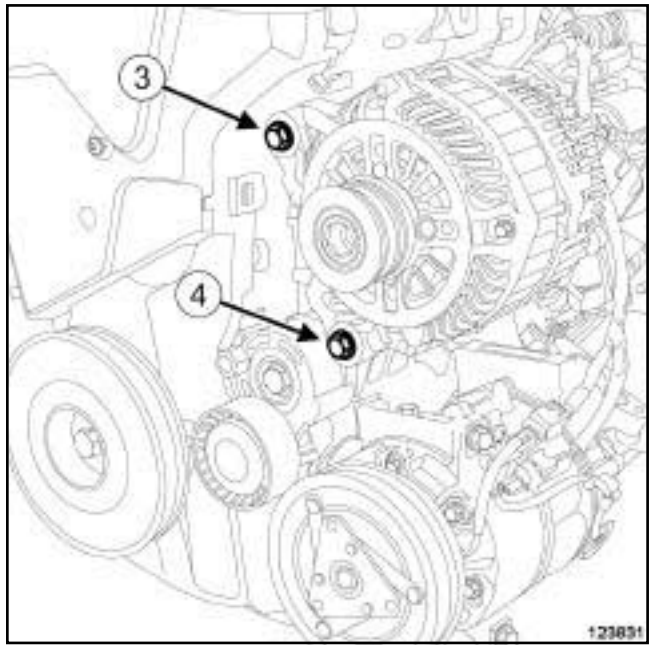


145195

❏ Remove:

- the alternator lead nut (**1**) ,
- the lead from the alternator.

❏ Disconnect the connector (**2**) .



123831

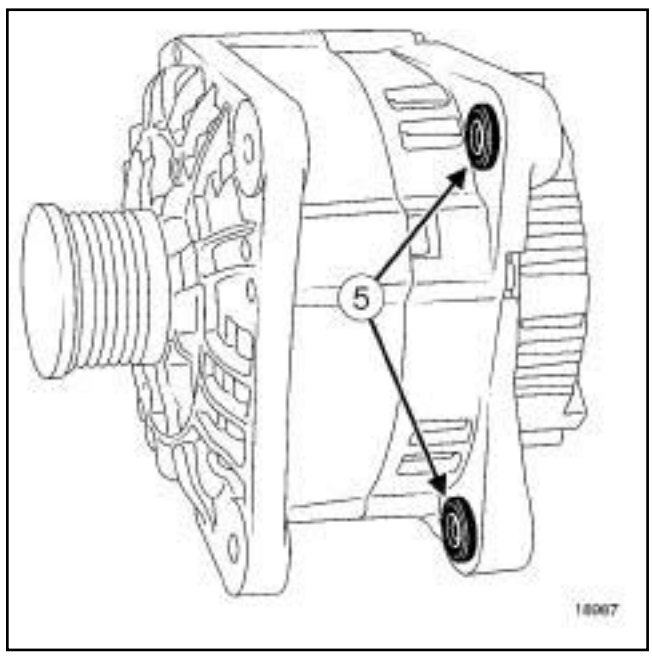
❏ Remove the alternator upper bolt (**3**) .

❏ Loosen the alternator lower bolt (**4**) .

❏ Remove the alternator with its lower bolt.

REFITTING

I - REFITTING PREPARATION OPERATION



18987

❏ Push in the alternator rings (**5**) to facilitate fitting.

K9K

II - REFITTING OPERATION

❏ Refit:

- the alternator with its lower bolt,
- the alternator upper bolt.

❏ Torque tighten the **alternator bolts (21 N.m)**.

❏ Connect the connector to the alternator.

❏ Refit the alternator lead.

❏ Torque tighten the **alternator lead nut (14 N.m)**.

III - FINAL OPERATION

❏ Refit the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M, and POWER ASSISTED STEERING, and AIR CONDITIONING

Tightening torques ▽	
alternator bolts	**21 N.m**
alternator lead nut	**14 N.m**

REMOVAL

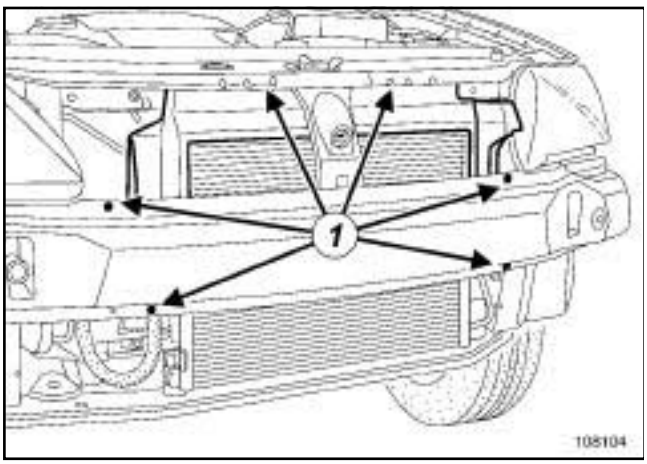
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

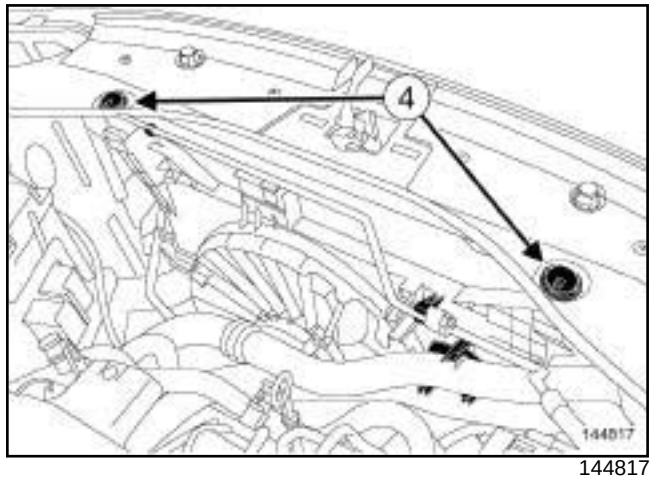
- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .



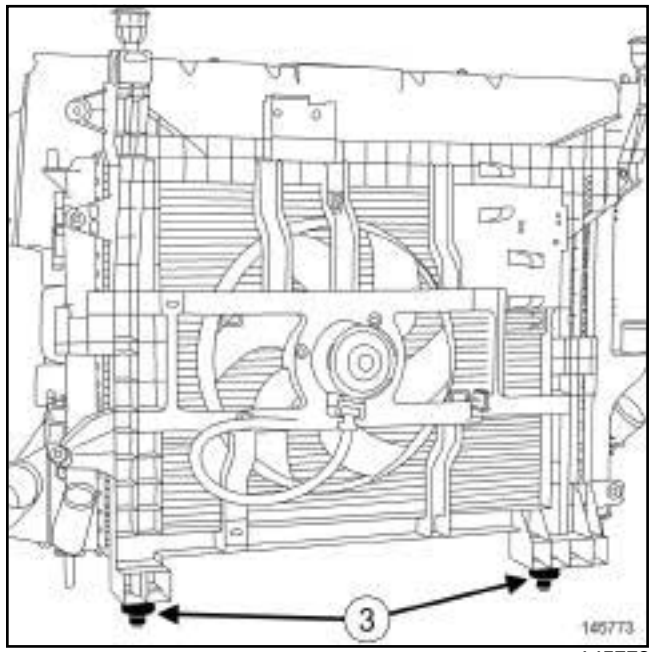
108104

❏ Remove:

- the air deflector mounting pins (**1**) ,
- the air deflector.



144817



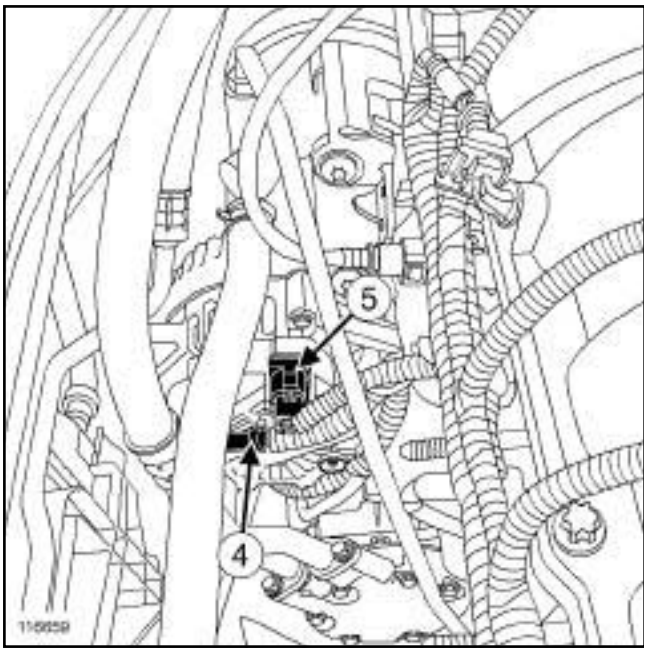
145773

❏ Remove the upper mountings (**4**) from the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-27**) .

❏ Extract the « engine cooling fan - cooling radiator - condenser » assembly from its lower mountings ***(3)*** and slide it to the left.

K4M, and POWER ASSISTED STEERING, and AIR CONDITIONING

II - REMOVAL OPERATION

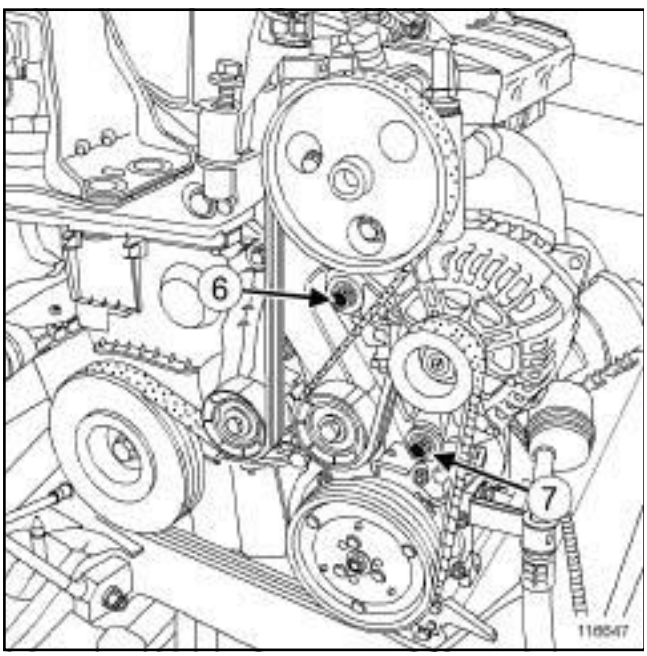


116659

❑ Remove:

- the alternator lead nut,
- the alternator lead (**4**) .

❑ Disconnect the alternator connector (**5**) .



116647

❑ Remove the alternator upper bolt (**6**) .

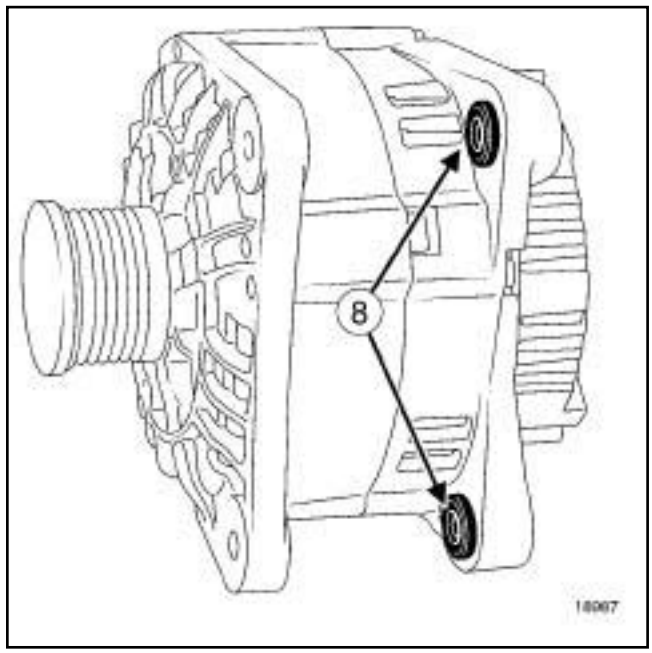
❑ Loosen the alternator lower bolt ***(7)*** .

❑ Move the alternator away from the multifunction support using a screwdriver.

❑ Remove the alternator and its lower mounting bolt.

REFITTING

I - REFITTING PREPARATION OPERATION



18987

❑ Push the rings (**8**) to make fitting easier.

II - REFITTING OPERATION

❑ Refit the alternator.

❑ Torque tighten the **alternator bolts (21 N.m)**.

❑ Connect the connector to the alternator.

❑ Refit:

- the lead to the alternator,
- the alternator lead nut.

❑ Torque tighten the **alternator lead nut (14 N.m)**.

III - FINAL OPERATION

❑ Slide the « engine cooling fan - cooling radiator - condenser » assembly to the right and fit it in its lower mountings.

❑ Refit the upper mountings of the engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-27**) .

❑ Refit:

- the air deflector,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,

- the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M, and STANDARD HEATING RECIRCULATION

Tightening torques ▽	
alternator bolts	**21 N.m**
positive terminal nut on the alternator	**14 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

❏

IMPORTANT

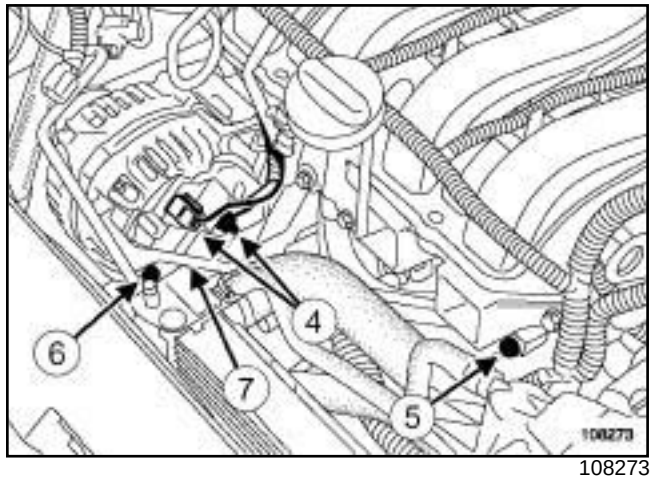
During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

❏ Disconnect the fuel supply pipe union ***(3)*** on the injector rail.

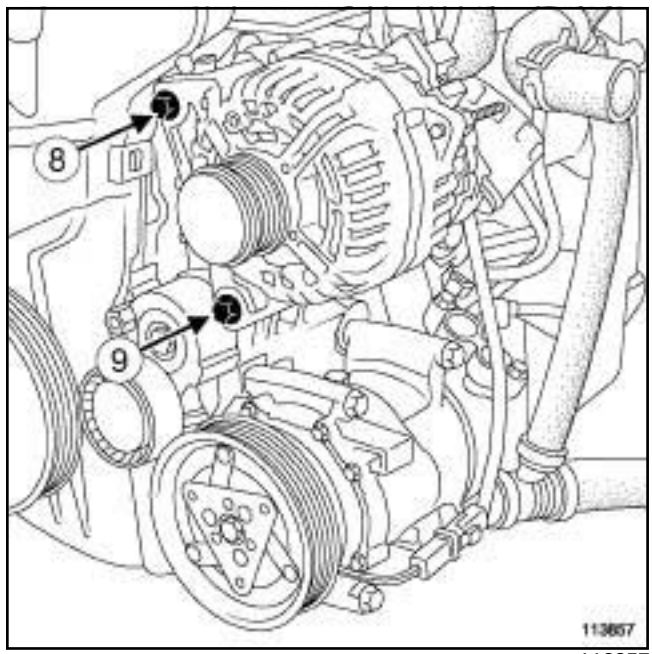


108273

❏ Disconnect the alternator's electrical connections (**4**) .

❏ Move aside the alternator wiring.

II - REMOVAL OPERATION



113857

❏ Remove the alternator upper bolt (**8**) .

❏ Loosen the alternator lower bolt (**9**) .

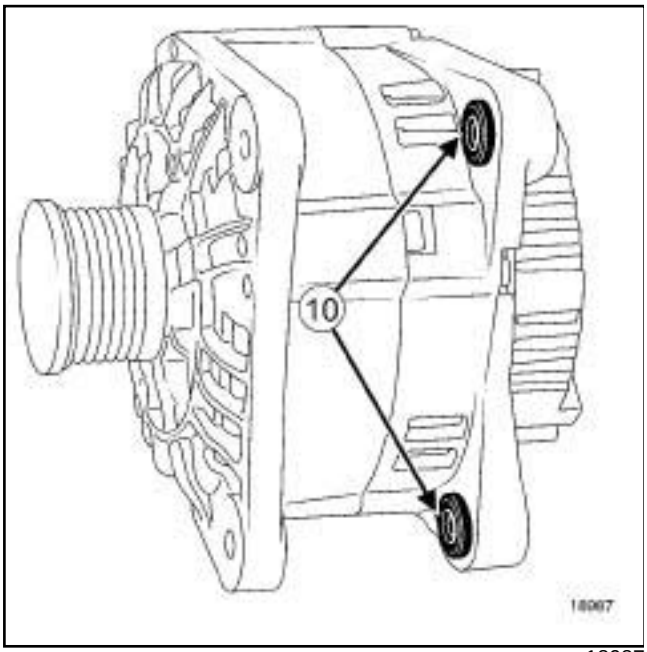
❏ Move the alternator away from the multifunction support using a screwdriver.

❏ Remove the alternator with its lower bolt upwards.

K4M, and STANDARD HEATING RECIRCULATION

REFITTING

I - REFITTING PREPARATION OPERATION



18987

❏ Push the rings (**10**) to make fitting easier.

II - REFITTING OPERATION

❏ Refit the alternator.

❏ Torque tighten the **alternator bolts (21 N.m)**.

III - FINAL OPERATION

❏ Connect the alternator electrical connections.

❏ Torque tighten the **positive terminal nut on the alternator (14 N.m)**.

❏ Connect the fuel supply pipe union on the injector rail.

❏ Refit:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

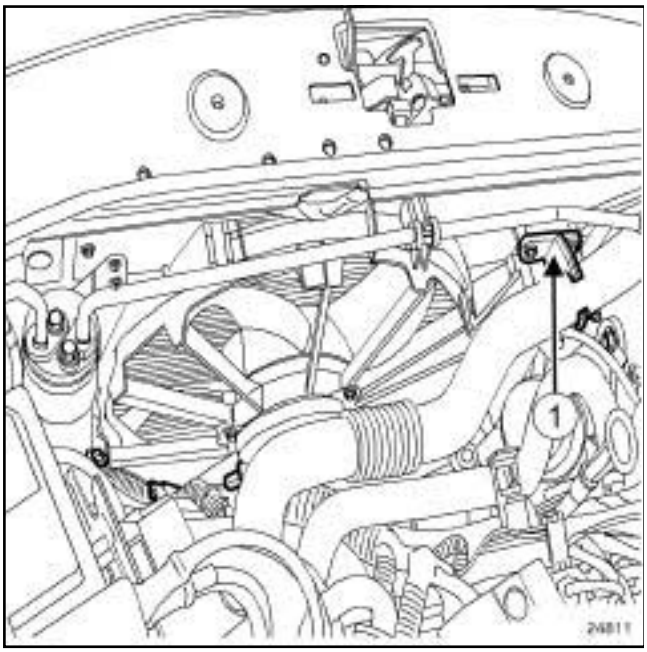
❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Tightening torques ▽	
starter bolts	**44 N.m**
nut on the starter solenoid lead	**5 N.m**
starter lead nut	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

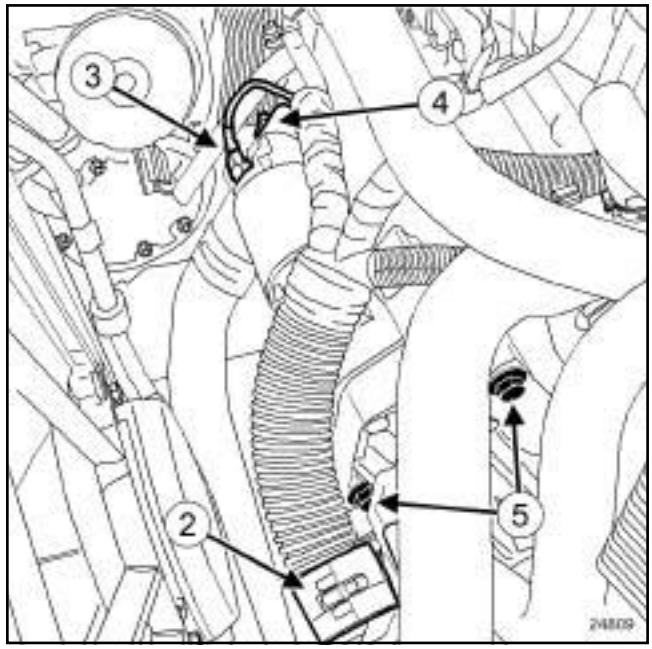
❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).



24811

❏ Unclip the intercooler duct on the fan assembly at (**1**) .

❏ Move aside the intercooler duct.



24809

❏ Unclip the engine wiring at (**2**) .

II - REMOVAL OPERATION

❏ Remove:

- the nut ***(3)*** on the starter solenoid lead,
- the nut ***(4)*** on the starter lead,
- the starter leads,
- the starter bolts ***(5)*** ,
- the starter.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Check that the starter centring dowel is in place.

II - REFITTING OPERATION

❏ Refit the starter.

❏ Torque tighten the **starter bolts (44 N.m)**.

❏ Refit the starter leads.

❏ Torque tighten:

- the **nut on the starter solenoid lead (5 N.m)**,
- the **starter lead nut (8 N.m)**.

K9K

III - FINAL OPERATION

❑ Clip:

- the engine wiring,
- the intercooler duct on the fan assembly.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
starter bolts	**44 N.m**
starter lead nut	**8 N.m**
nut on the starter solenoid lead	**5 N.m**

REMOVAL

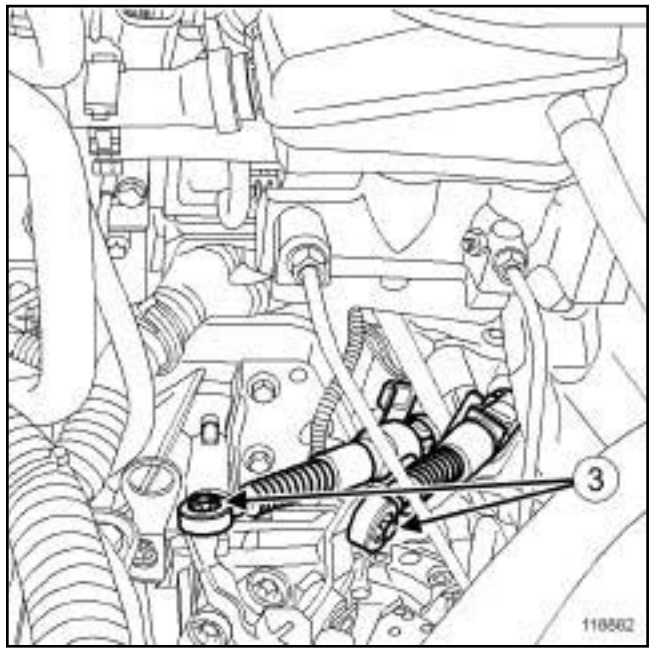
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

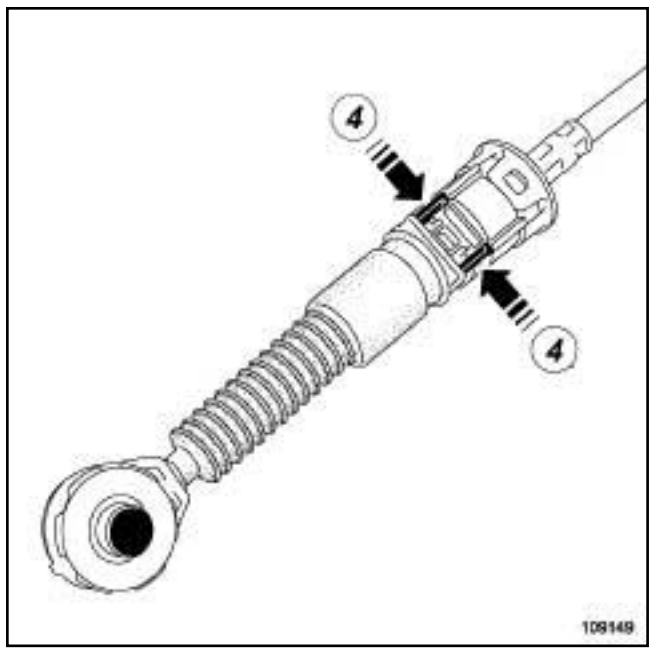
❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

JR5



118882



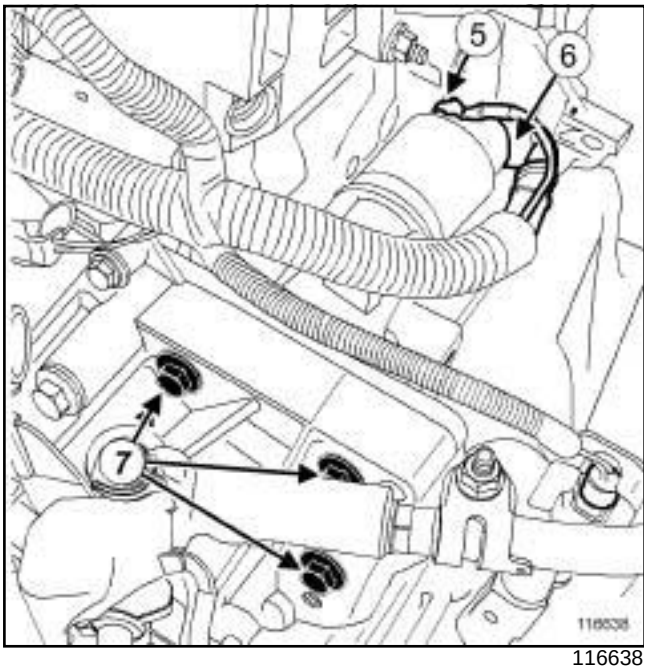
109149

❏ Unclip:

- the gear control cables on the gearbox at (**3**) using a screwdriver,
- the gearbox control cable sleeve stops by pressing at (**4**) .

K4M

II - REMOVAL OPERATION



116638

❑ Remove:

- the nut (**5**) on the starter solenoid lead,
- the nut (**6**) on the starter lead,
- the starter bolts (**7**) ,
- the starter from underneath the vehicle.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Check that the centring dowel is in place.

II - REFITTING OPERATION

❑ Refit:

- the starter from underneath the vehicle,
- the starter bolts.

❑ Torque tighten the **starter bolts (44 N.m)**.

❑ Refit:

- the starter leads,
- the starter lead nut,
- the nut on the starter solenoid lead.

❑ Torque tighten:

- the **starter lead nut (8 N.m)**,
- the **nut on the starter solenoid lead (5 N.m)**.

III - FINAL OPERATION

JR5

❑ Clip:

- the gearbox control cable sleeve stops on the gearbox,
- the control cables onto the gearbox.

❑ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Equipment required
pneumatic or electric wrench
torque wrench
open-ended spanner for torque wrench

Tightening torques ▽	
alternator pulley	**80 N.m**

I - REMOVAL PREPARATION OPERATION

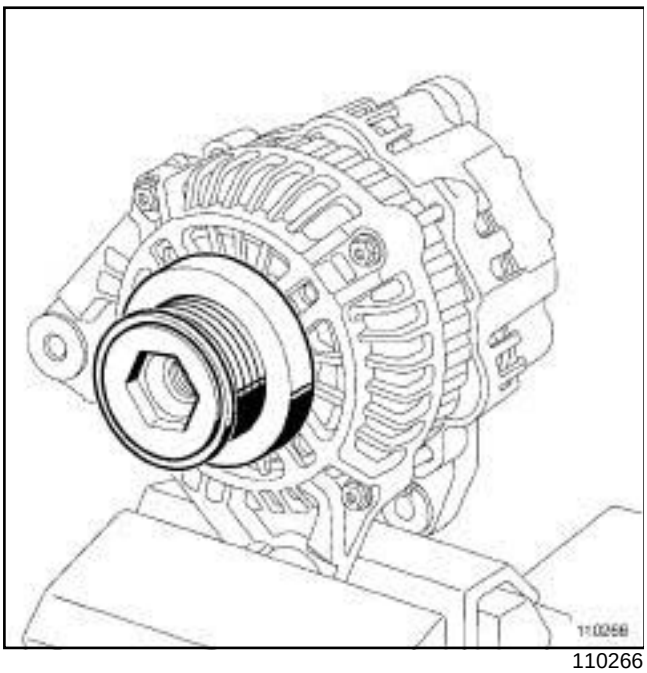
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) .

❏ Disconnect the battery (see **Battery: Removal - Refitting**) .

❏ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

II - REMOVAL OPERATION FOR ALTERNATOR PULLEY



110266

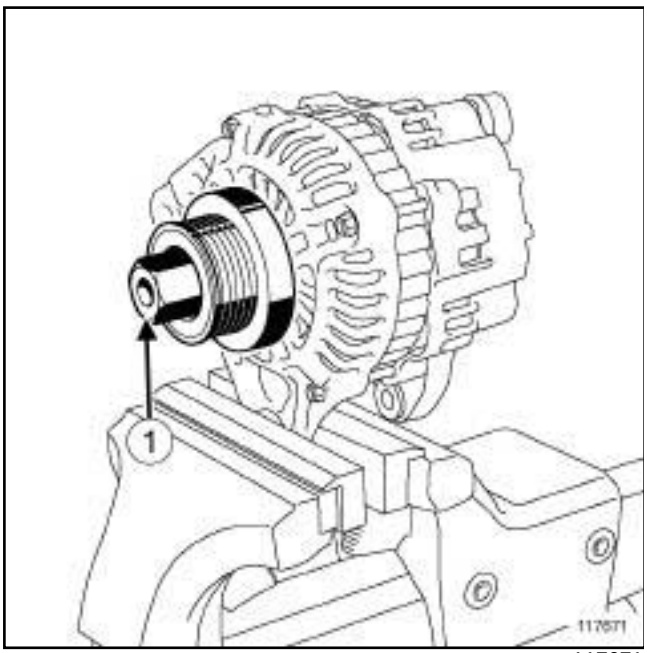
❏ Unclip the alternator pulley protector (if equipped).

❏ Place the alternator in a vice jaw.

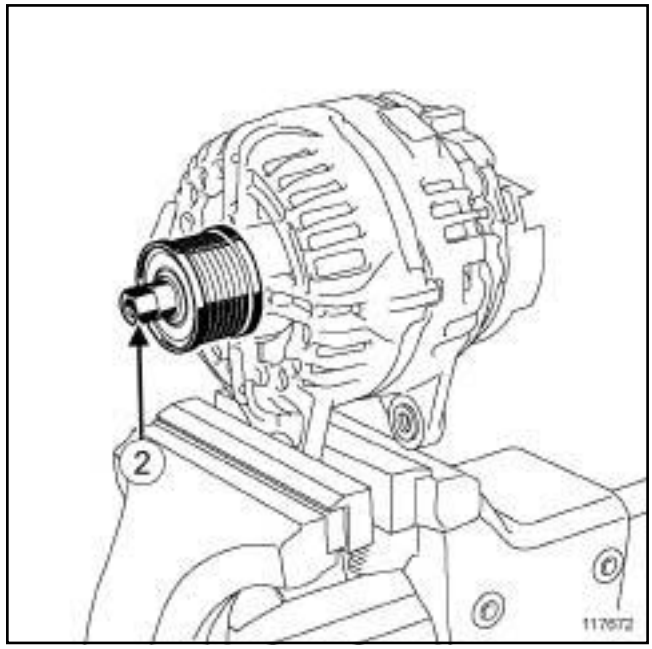
K4M

Mot. 1732

110276



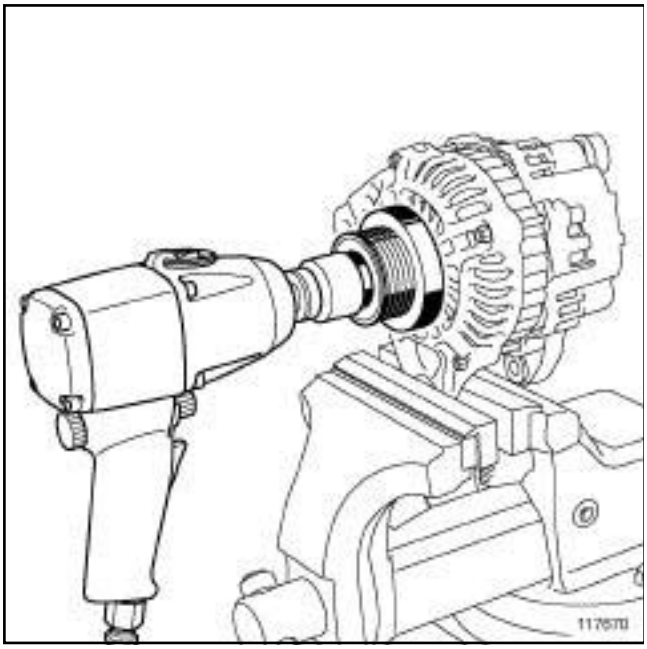
117671



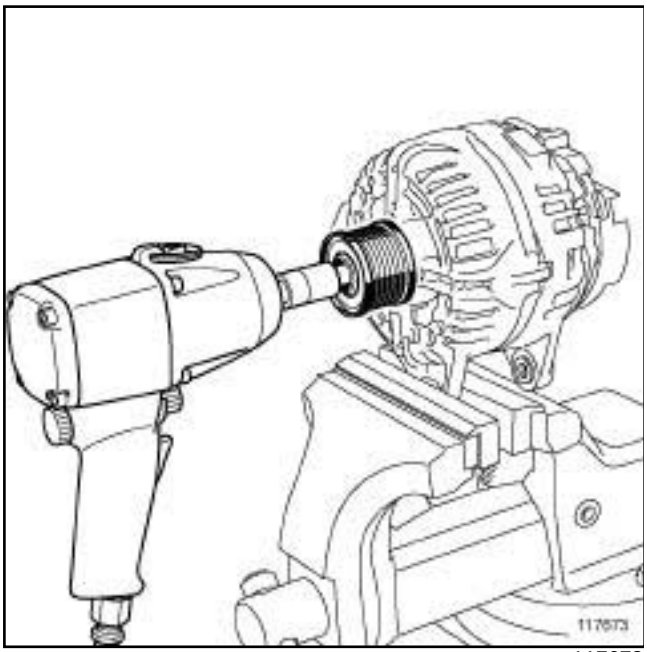
117672

❑ Position the hexagonal socket (**1**) or the splined socket (**2**) from the kitorin the alternator pulley (depending on the version).

K4M



117670



117673

❑

Note:

Always use a pneumatic or electric impact wrench to loosen the alternator pulley

Loosen the alternator pulley using a **pneumatic or electric wrench**.

❑

Remove:

- the tools,
- the alternator pulley.

III - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: Accessories belt**

parts always to be replaced: Accessories fixed roller

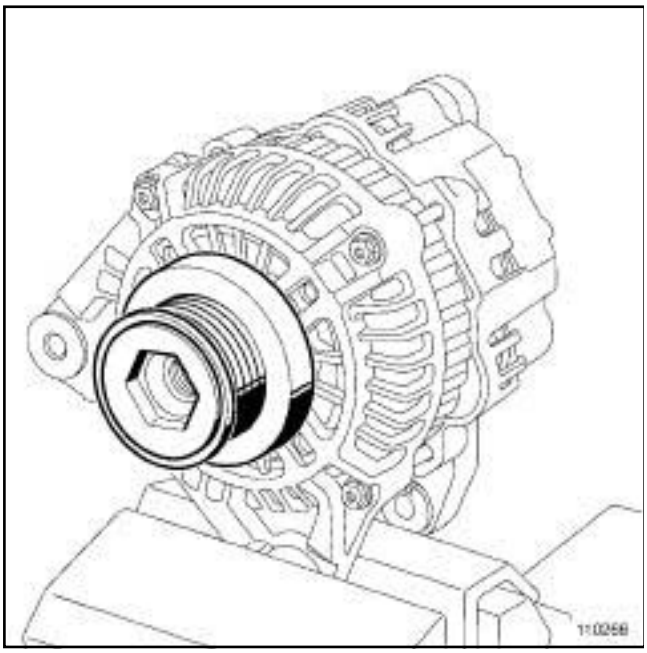
parts always to be replaced: Accessories belt tensioning roller

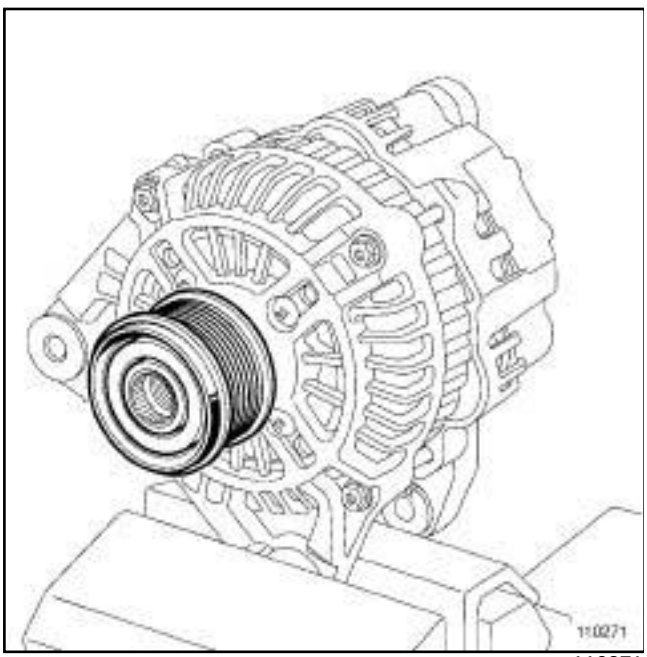
parts always to be replaced: Accessories tensioning roller bolt

parts always to be replaced: Alternator pulley

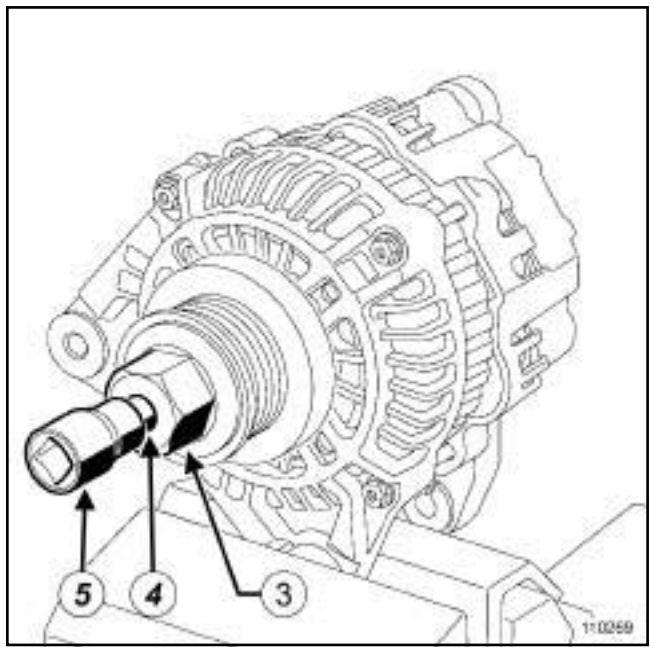
K4M

IV - REFITTING OPERATION FOR THE ALTERNATOR PULLEY

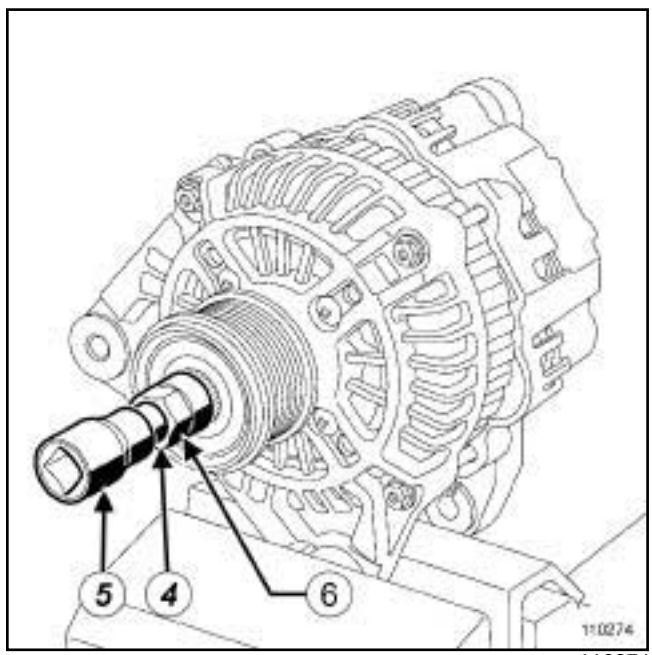

110266


110271

❑ Tighten the new alternator pulley.



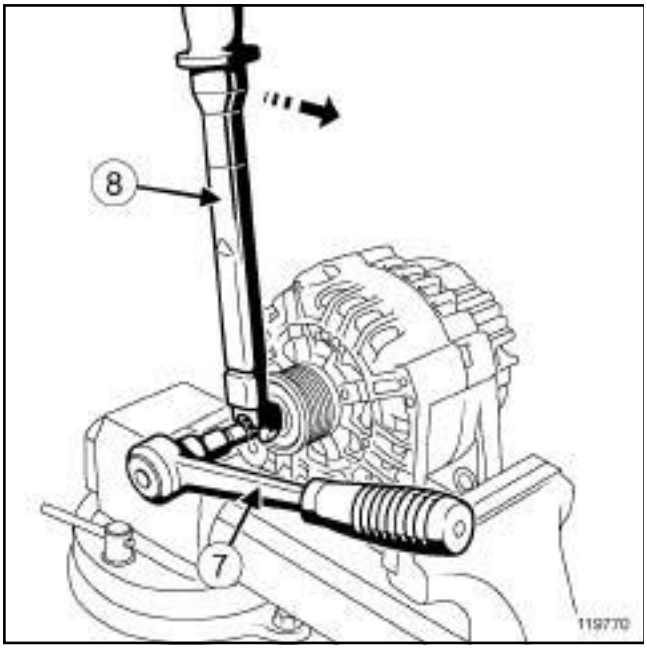
110269



110274

❑ Position:

- the hexagonal socket (**3**) or the splined socket (**6**) in the alternator pulley (depending on the version),
- the end piece (**4**) in the recess of the alternator rotor,
- the end piece holder (**5**) on the end piece.



119770

❏ Immobilise the alternator rotor using the spanner (**7**) .

❏ Torque tighten the **alternator pulley (80 N.m)** using the **torque wrench** (**8**) equipped with a **15mm open-ended spanner for torque wrench**.

❏ Remove the tools.

❏ Clip the new protector onto the alternator pulley (if equipped).

V - FINAL OPERATION

❏ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) .

K9K

Tightening torques ▽	
alternator pulley nut	**80 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

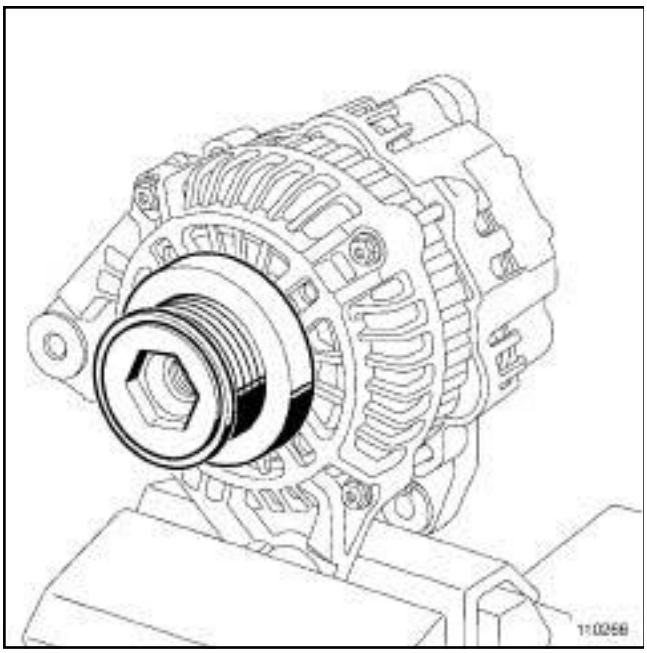
❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) .

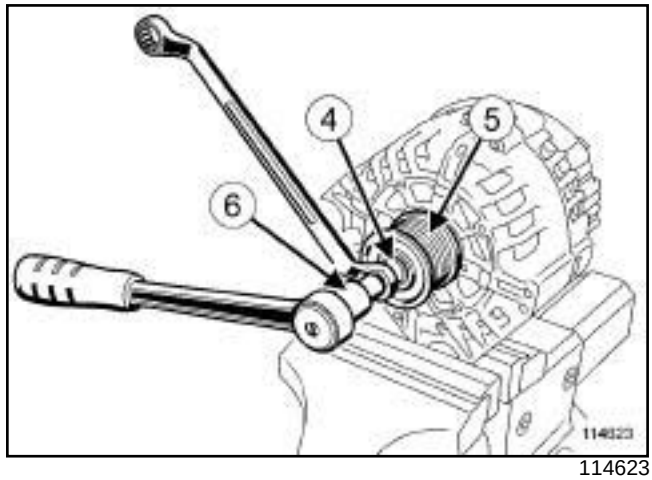
II - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Unclip the alternator pulley protector (if equipped).



110266

❏ Place the alternator in a vice jaw.



114623

❏ Fit:

- the splined socket (**4**) of thein the free wheel pulley (**5**) ,
- the end piece and holder assembly (**6**) of theon the alternator shaft.

❏ Immobilise the splined socket (**4**) .

❏ Loosen the alternator shaft.

❏

Note:

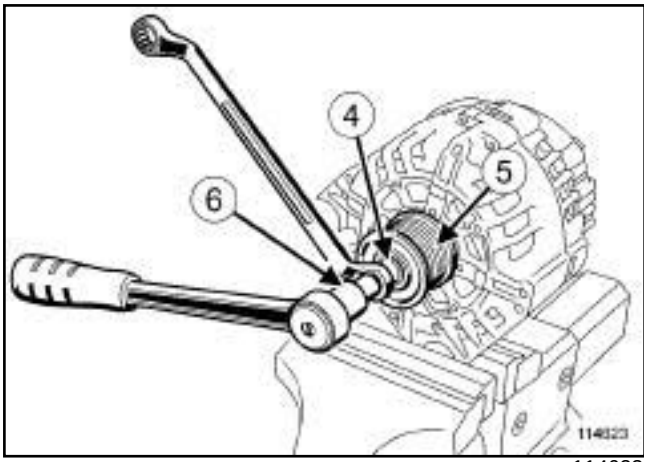
Do not use a screwdriver to remove or refit the pulley. A damaged or deformed front bearing can lead to damage to the alternator.

❏ Remove the free wheel pulley.

REFITTING

I - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the pulley to the alternator shaft



114623

❑ Fit:

- the splined socket (**4**) of thein the free wheel pulley (**5**) ,
- the end piece and holder assembly (**6**) of theon the alternator shaft.

❑ Immobilise the splined socket (**4**) .

❑ Torque tighten the **alternator pulley nut (80 N.m)**.

❑ Turn the pulley by hand to check that the rotor turns easily.

❑ Clip on the alternator pulley protector (if equipped).

II - FINAL OPERATION

❑ Refit:

- the alternator (see **16A**, **Starting - Charging**, **Alternator: Removal - Refitting**, page **16A-1**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

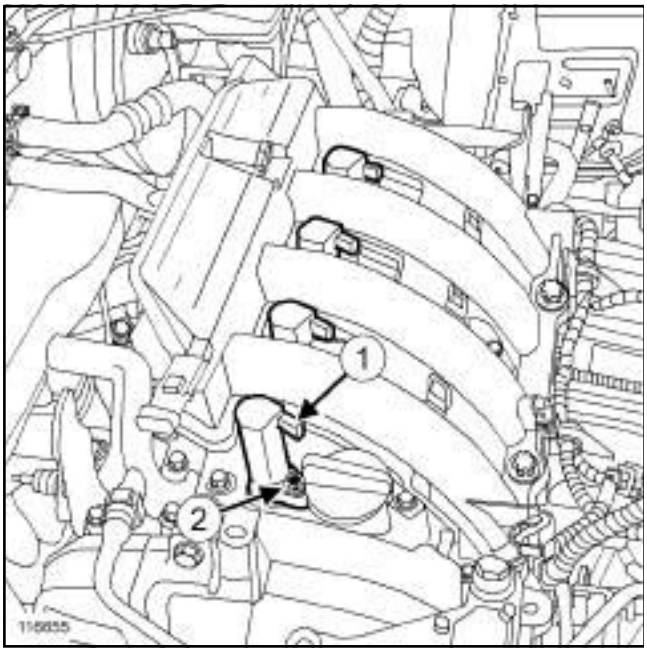
❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K4M

Tightening torques ▽	
ignition coil bolts	**14 N.m**

REMOVAL

REMOVAL OPERATION



116655

❏ Disconnect the connectors (**1**) from the ignition coils.

❏ Remove:

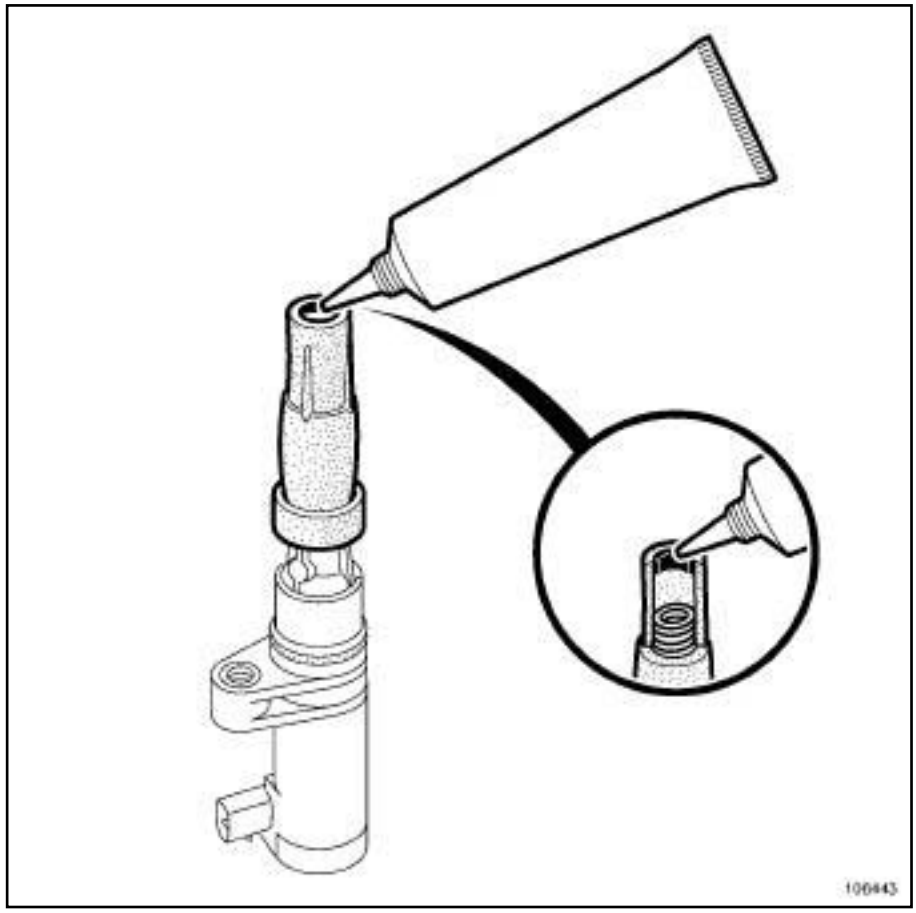
- the ignition coil bolts (**2**) ,
- the ignition coils.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the **ignition coil bolts**.

❏ If necessary, replace the ignition coil O-rings.



106443

❑ When refitting the ignition harness, it is essential to apply a bead of **FLUOSTAR 2L 2 mm** in diameter around the inner edge of the high-tension caps on the side of the spark plugs and coil (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables-Products).

II - REFITTING OPERATION

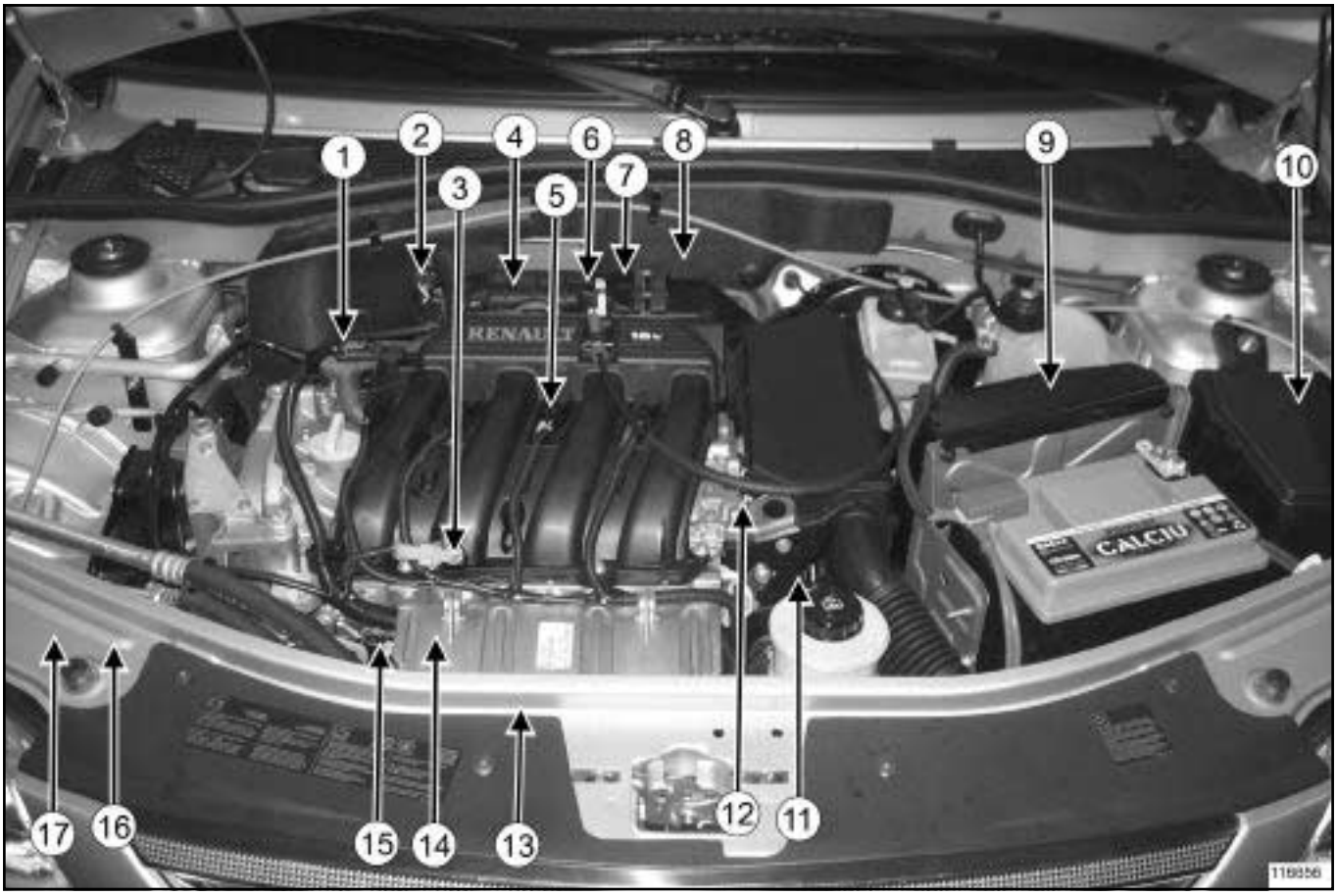
❑ Refit:

- the ignition coils,
- the new ignition coil bolts.

❑ Torque tighten the **ignition coil bolts (14 N.m)**.

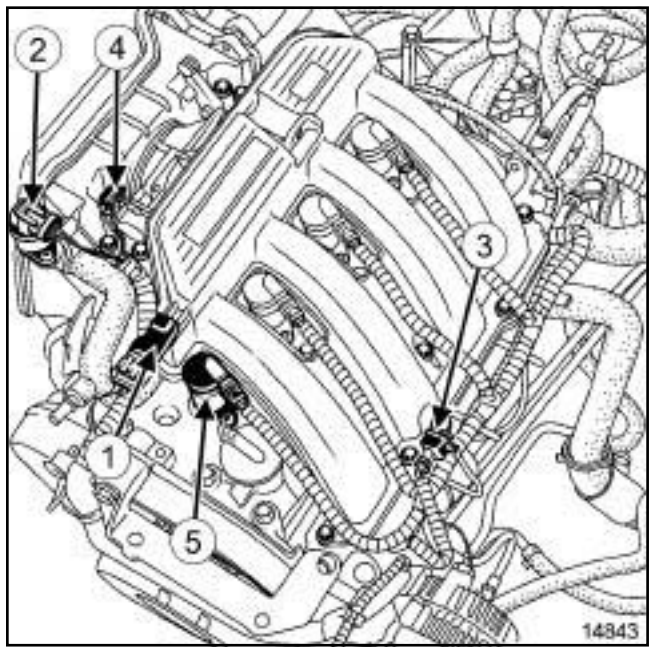
❑ Connect the ignition coil connectors.

K4M



116656

(**1**) Air pressure sensor
(**2**) Idle speed stepper motor
(**3**) Air temperature sensor
(**4**) Throttle position potentiometer
(**5**) Ignition coil
(**6**) Throttle valve
(**7**) Upstream oxygen sensor
(**8**) Downstream oxygen sensor
(**9**) Injection computer
(**10**) Relay unit
(**11**) Crankshaft position sensor
(**12**) Coolant temperature sensor
(**13**) Pinking sensor
(**14**) Injectors
(**15**) Injector rail
(**16**) Fuel vapour recirculation solenoid valve
(**17**) Petrol vapour absorber



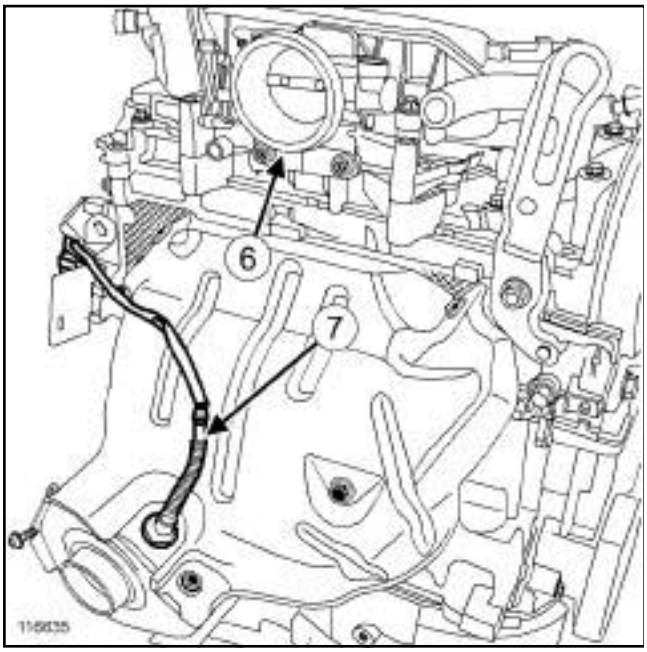
14843

(**1**) Air pressure sensor
(**2**) Idle speed stepper motor
(**3**) Air temperature sensor

K4M

(**4**) Throttle position potentiometer

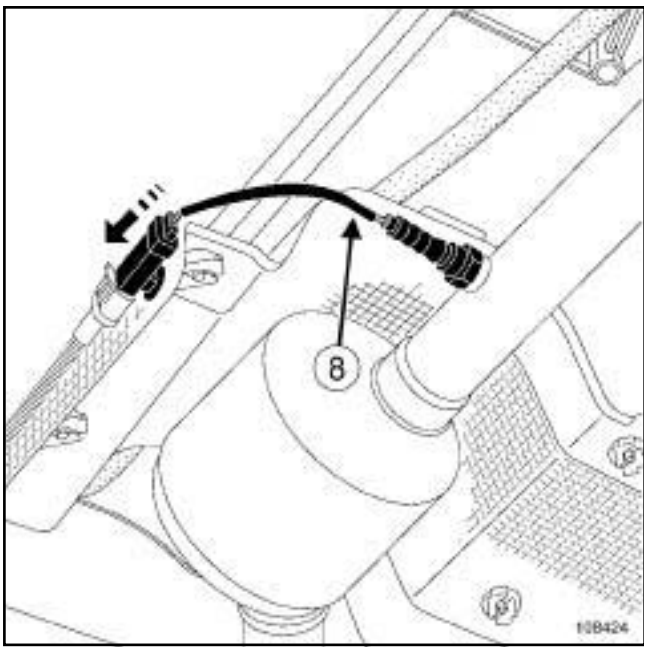
(**5**) Ignition coil



116635

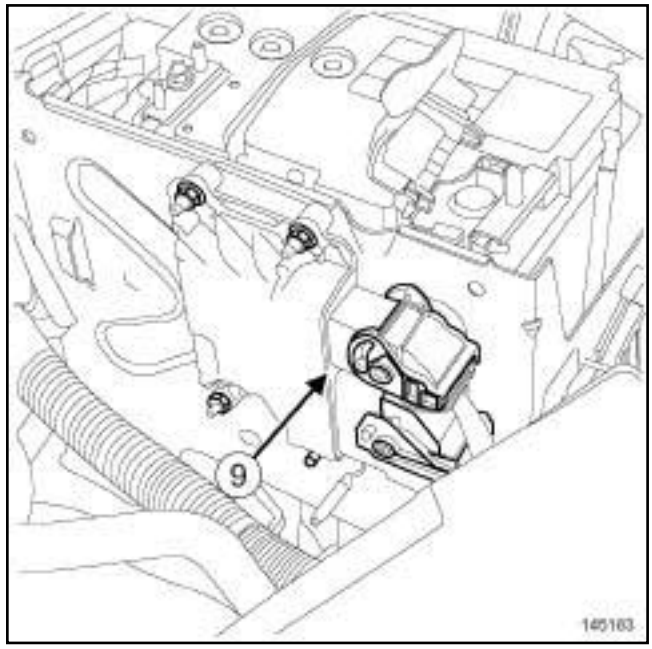
(**6**) Throttle valve

(**7**) Upstream oxygen sensor



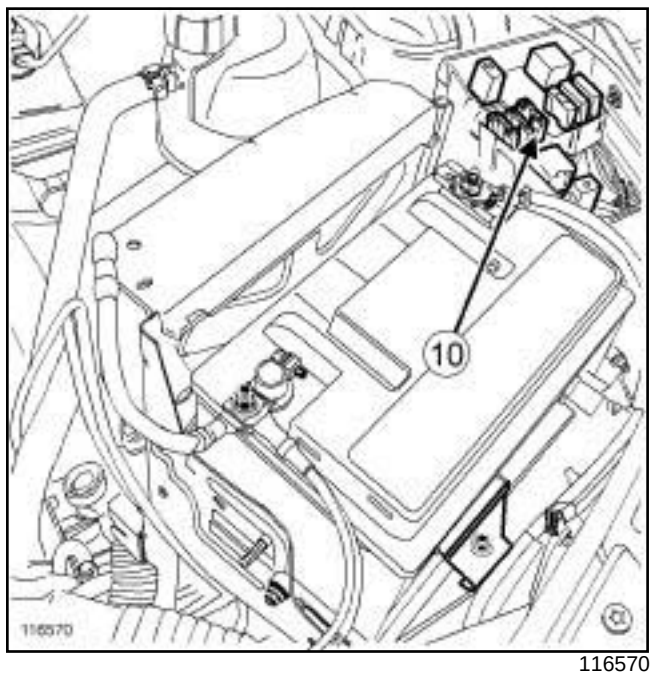
108424

(**8**) Downstream oxygen sensor



145183

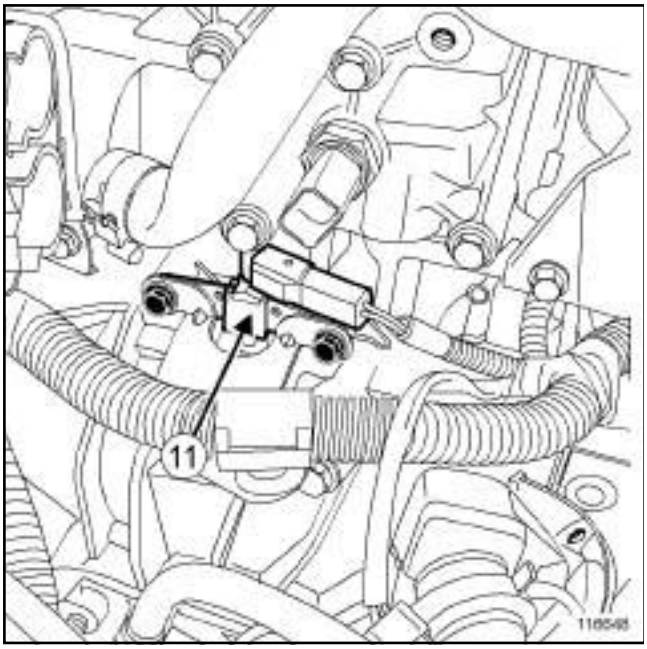
(**9**) Injection computer



116570

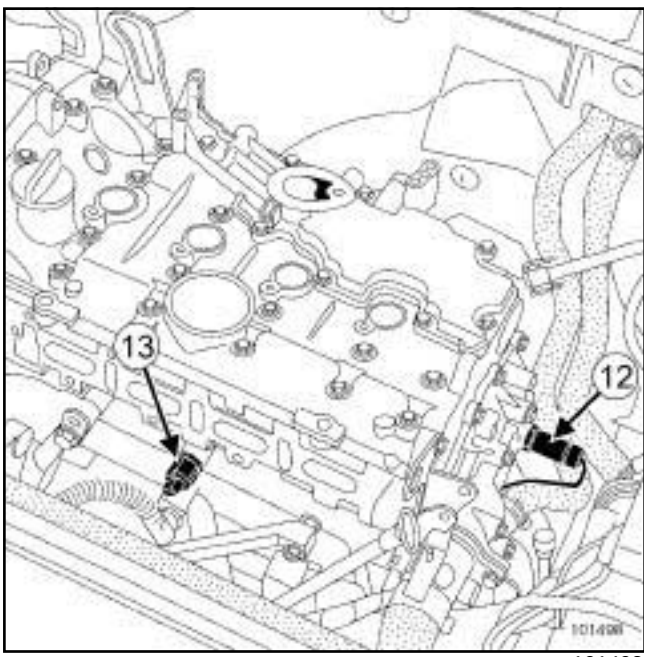
(**10**) Relay unit

K4M



116648

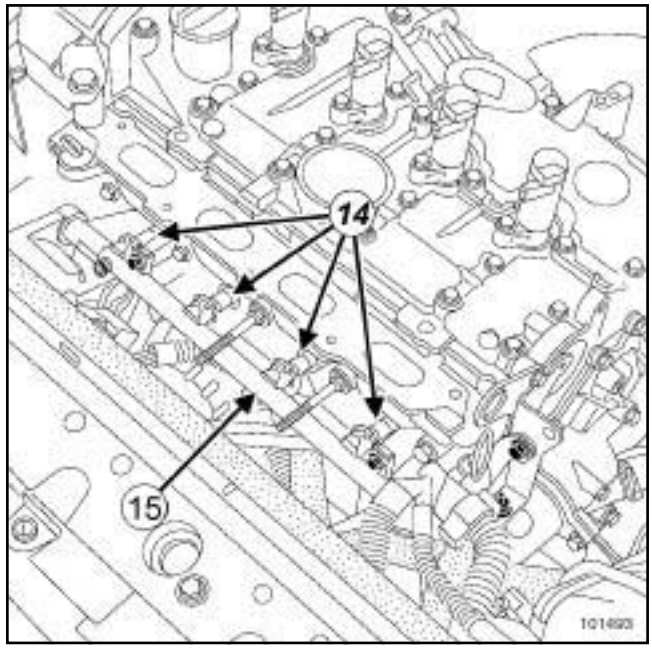
(**11**) Crankshaft position sensor



101498

(**12**) Coolant temperature sensor

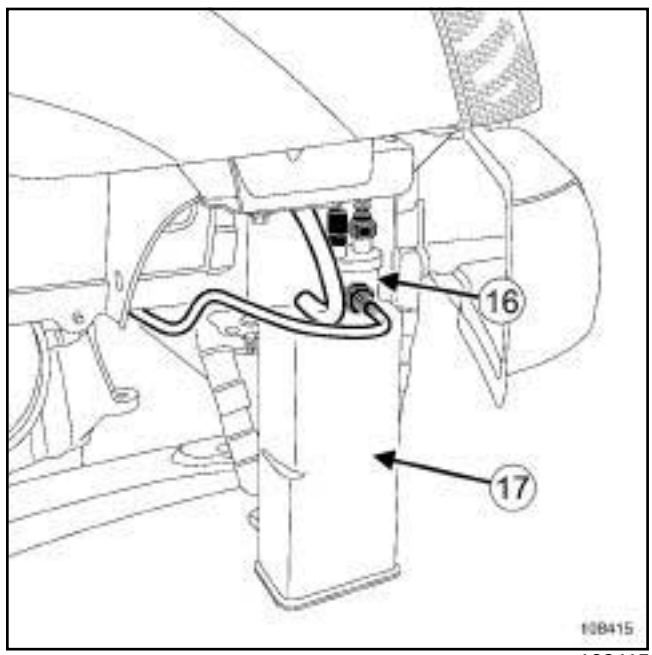
(**13**) Pinking sensor



101493

(**14**) Injectors

(**15**) Injector rail



108415

(**16**) Fuel vapour recirculation solenoid valve

(**17**) Petrol vapour absorber

K4M

Tightening torques ▽	
upstream oxygen sensor	**45 N.m**
downstream oxygen sensor	**45 N.m**

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice causes the oxygen sensor to malfunction and results in failure to comply with the emission control standard.

WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair**) (Technical Note 6015A, 88A, Wiring).

REMOVAL

I - REMOVAL PREPARATION OPERATION

1 - Upstream oxygen sensor

❏ Remove:

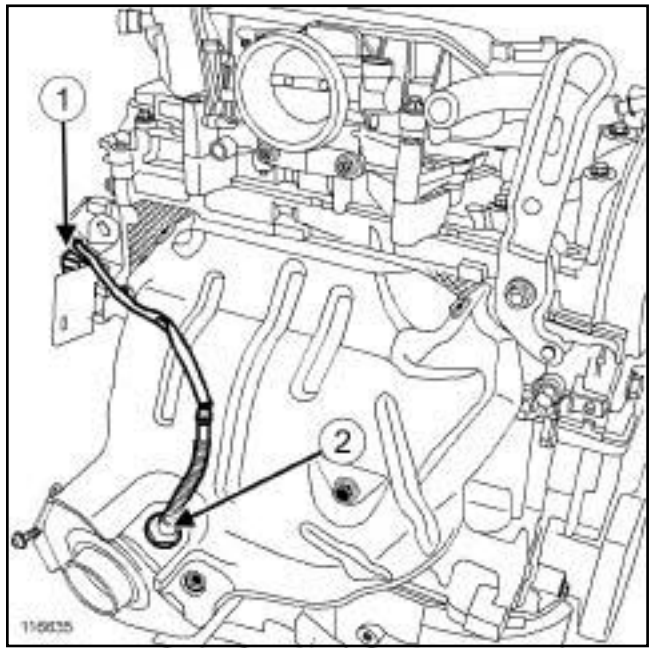
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

2 - Downstream oxygen sensor

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

II - REMOVAL OPERATION

1 - Upstream oxygen sensor



116635

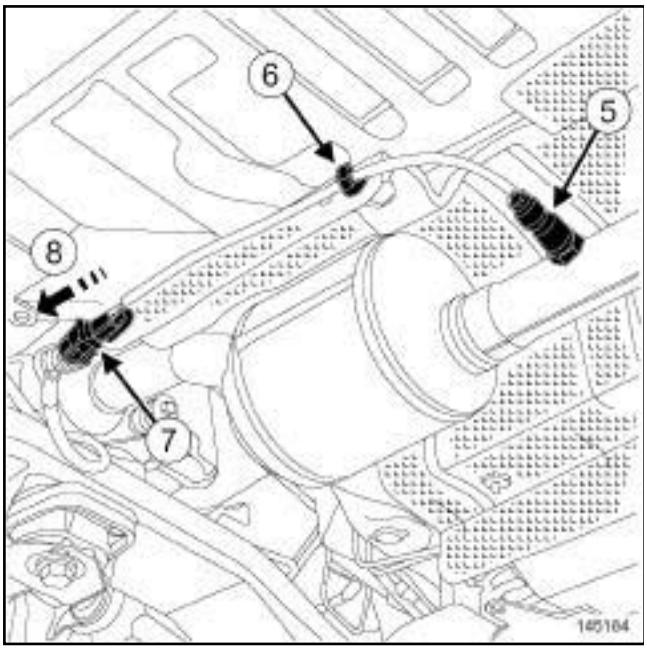
❏ Disconnect the upstream oxygen sensor connector (**1**) .

❏ Unclip the upstream oxygen sensor wiring.

❏ Remove the upstream oxygen sensor (**2**) using the.

K4M

2 - Downstream oxygen sensor



145184

❑ Unclip the wiring from the downstream oxygen sensor at (**6**) .

❑ Remove the downstream oxygen sensor connector (**7**) from its mounting by sliding it (**8**) .

❑ Disconnect the downstream oxygen sensor connector.

❑ Remove the downstream oxygen sensor ***(5)*** using the.

REFITTING

I - REFITTING OPERATION

1 - Upstream oxygen sensor

❑ Refit the upstream oxygen sensor.

❑ Torque tighten the **upstream oxygen sensor (45 N.m)** using the.

❑ Attach the upstream oxygen sensor wiring.

❑ Connect the upstream oxygen sensor connector.

2 - Downstream oxygen sensor

❑ Refit the downstream oxygen sensor.

❑ Torque tighten the **downstream oxygen sensor (45 N.m)** using the tool.

❑ Connect the downstream oxygen sensor connector.

❑ Refit the downstream oxygen sensor connector in its support.

❑ Clip on the downstream oxygen sensor wiring at ***(6)*** .

II - FINAL OPERATION

Upstream oxygen sensor

❑ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

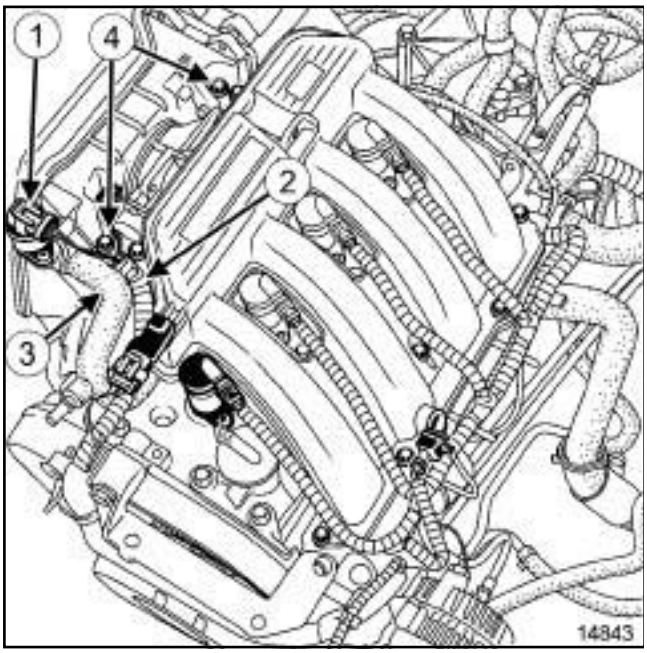
K4M

Tightening torques ▽	
throttle valve potentiometer bolts	**2.4 N.m**
air filter unit bolts	**9 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .



14843

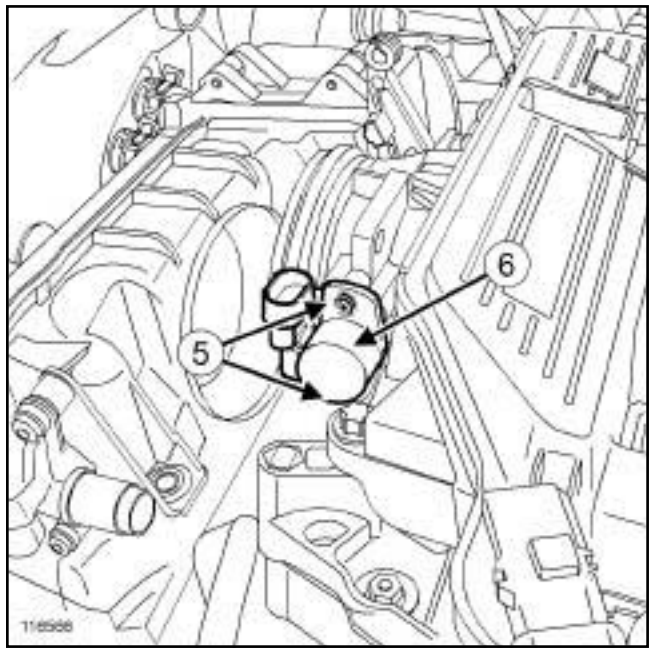
❏ Disconnect:

- the connector (**1**) from the idle speed regulation stepping motor,
- the connector (**2**) from the throttle valve potentiometer,
- the petrol vapour recirculation pipe (**3**) .

❏ Remove the two bolts ***(4)*** from the air filter unit.

❏ Remove the air filter unit from the throttle valve.

II - REMOVAL OPERATION



116566

❏ Remove:

- the two bolts (**5**) from the throttle valve potentiometer,
- the throttle valve potentiometer (**6**) .

REFITTING

I - REFITTING OPERATION

❏ Refit:

- the throttle valve potentiometer,
- the two throttle valve potentiometer bolts.

❏ Torque tighten the **throttle valve potentiometer bolts (2.4 N.m)** using the tool.

II - FINAL OPERATION

❏ Refit the air filter unit in place.

❏ Refit the two air filter unit bolts.

❏ Torque tighten the **air filter unit bolts (9 N.m)**.

❏ Connect:

- the petrol vapour recirculation pipe,
- the connector from the throttle valve potentiometer,
- the idle speed regulation stepping motor connector.

❏ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

K4M

Equipment required
Diagnostic tool

Tightening torques ▽	
injection computer nuts	**8 N.m**

WARNING

Do not use any product designed to improve the electrical contact in the injection computer and oxygen sensor connectors or on the bodies of the oxygen sensors.

Failure to respect this advice causes the oxygen sensor to malfunction and results in failure to comply with the emission control standard.

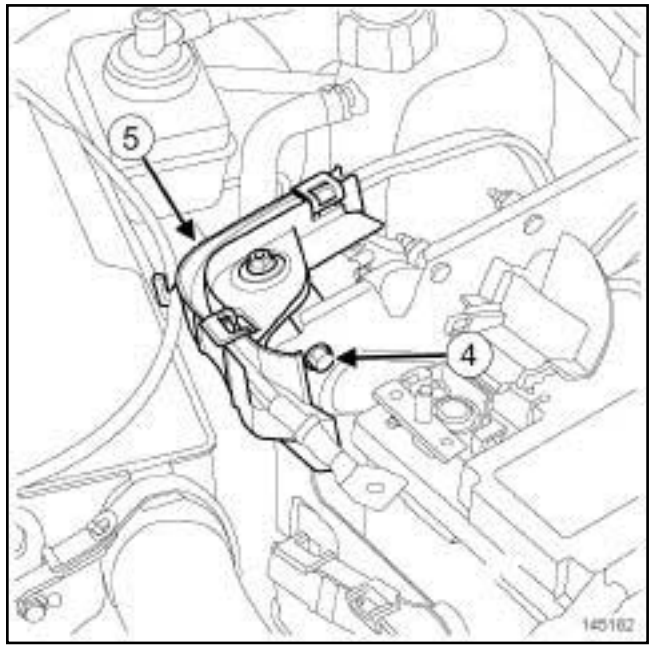
WARNING

If the connections are corroded, repair the wiring (see **Wiring: Precautions for repair**) (Technical Note 6015A, 88A, Wiring).

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

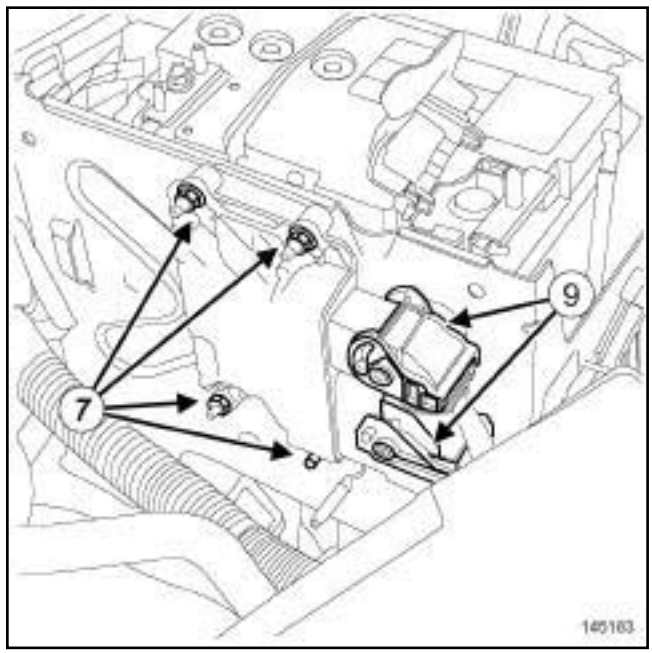


145182

❑ Remove the bolt (**4**) from the channel (**5**) .

❑ Move aside the channel.

II - REMOVAL OPERATION



145183

❑ Disconnect the two injection computer connectors (**9**) .

❑ Remove:

- the injection computer nuts ***(7)*** ,
- the injection computer.

K4M

REFITTING

I - REFITTING OPERATION

- ❏ Refit the injection computer.
- ❏ Torque tighten the **injection computer nuts (8 N.m)**.
- ❏ Connect the two connectors of the injection computer.

II - FINAL OPERATION

- ❏ Refit the channel.
- ❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

III - WHEN REPLACING THE INJECTION COMPUTER

- ❏ The computer supplied as a spare part is not operational (also known as "blank").
- ❏ After replacing the injection computer, program it using the **Diagnostic tool** (see **Technical Note 9869A, Procedure for programming and reprogramming the computer**).
- ❏ Carry out the configuration and/or necessary programming (see **Fault finding - Replacement of components)** (17B, Petrol injection).

K4M

Equipment required
Diagnostic tool

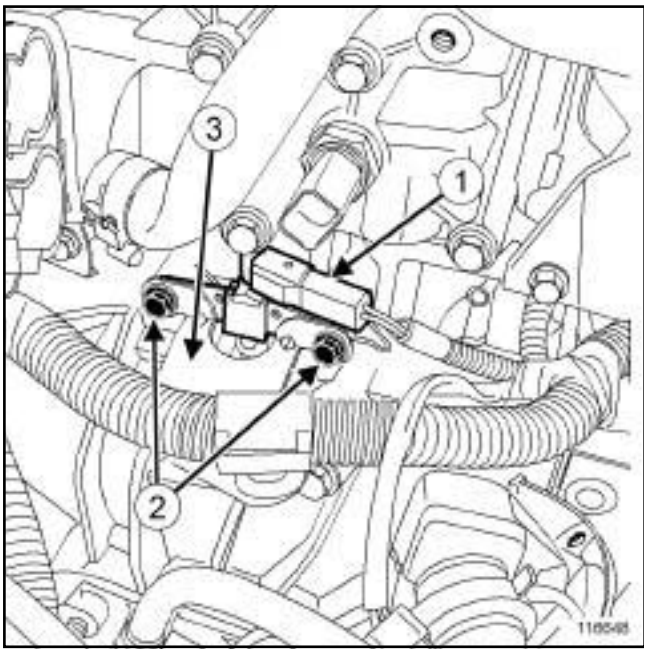
Tightening torques ▽	
crankshaft position sensor bolts	**8 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

II - REMOVAL OPERATION



116648

❑ Disconnect the crankshaft position sensor connector (**1**) .

❑ Remove the two bolts (**2**) from the crankshaft position sensor.

❑ Move aside the engine wiring harness mounting support (**3**) .

❑ Remove the crankshaft position sensor.

REFITTING

I - REFITTING OPERATION

❑ Refit the crankshaft position sensor.

❑ Refit the engine wiring harness mounting support.

❑ Refit the two bolts of the crankshaft position sensor.

❑ Torque tighten the **crankshaft position sensor bolts (8 N.m)**.

II - FINAL OPERATION

❑ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

III - WHEN REPLACING THE CRANKSHAFT POSITION SENSOR

❑ Program the flywheel target:

- perform a deceleration with injection cut-off in second, third, fourth or fifth gear between **3500** and **3000 rpm**, for at least **2 seconds**,
- perform a deceleration with injection cut-off in second, third, fourth or fifth gear between **2400** and **2000 rpm**, for at least **3 seconds**.

❑ Use the **Diagnostic tool** to check that this programming has been successfully completed, **ET060 Flywheel signal with engine running**.

❑ Read the fault codes.

❑ Repair if necessary.

❑ Clear the fault codes.

❑ Check that the vehicle is working correctly.

K4M

Tightening torques ▽	
injector rail bolts	**9 N.m**
injector rail protector nuts	**21 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

During this operation, be sure to:

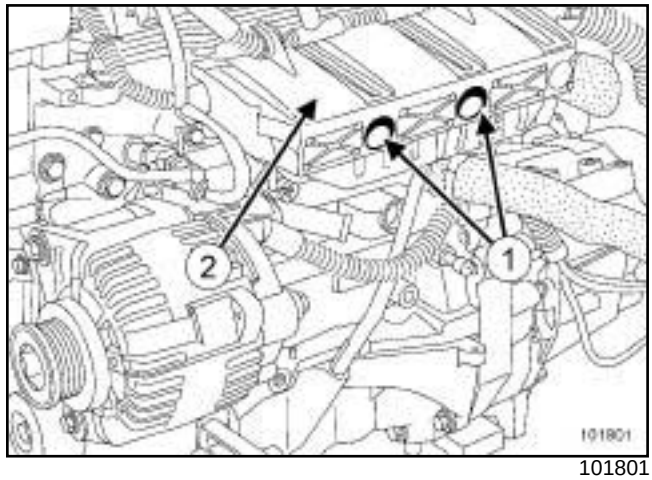
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT
Be careful when removing the injectors or the injection rail as there will be a quantity of fuel in the rail and the union.

REMOVAL

I - REMOVAL PREPARATION OPERATION

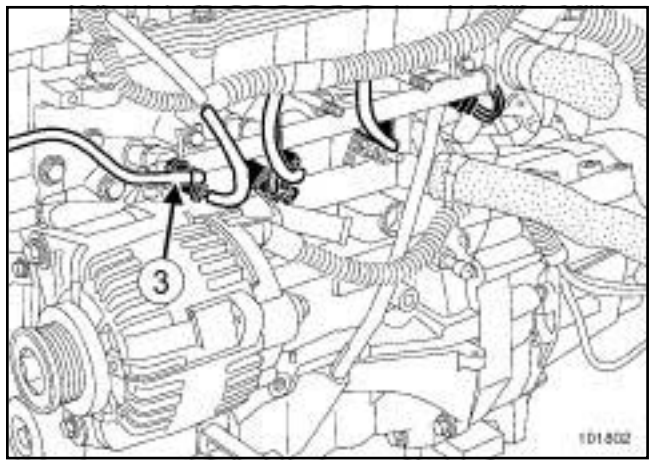
❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).



101801

❏ Remove:

- the two nuts (**1**) from the injector rail protector,
- the injector rail protector (**2**) .



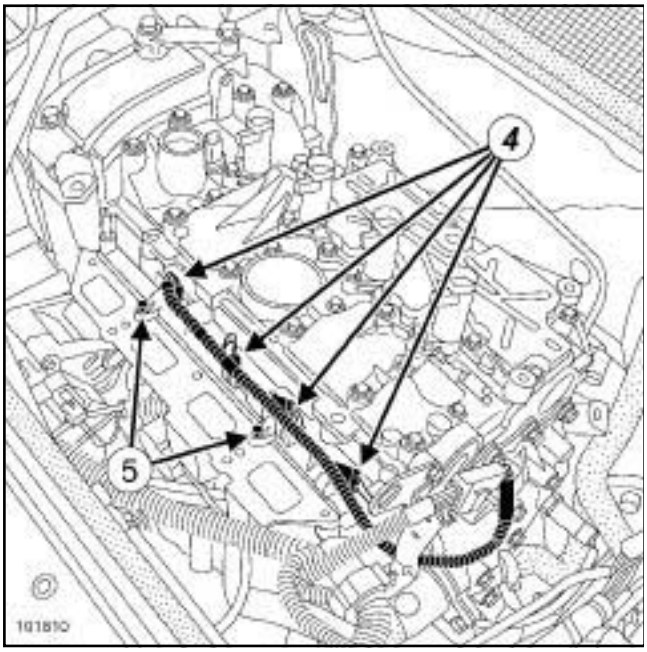
101802

❏ Disconnect the fuel supply pipe union (**3**) on the injector rail.

❏ Fit blanking plugs.

K4M

II - REMOVAL OPERATION

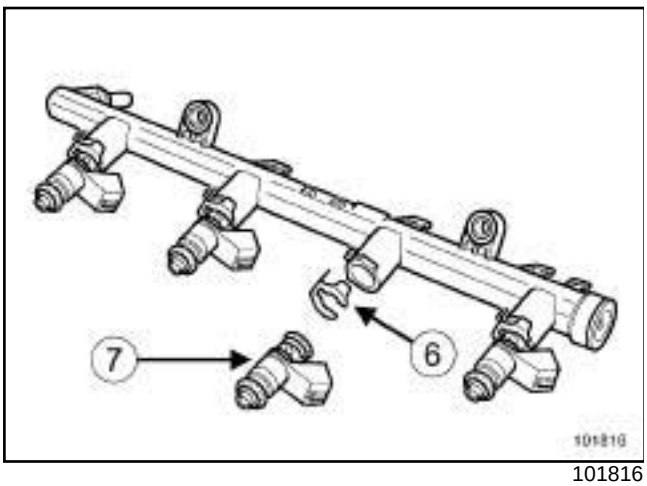


101810

❏ Disconnect the injector connectors (**4**) .

❏ Remove:

- the injector rail bolts (**5**) ,
- the « injector rail-injector» assembly by pulling it carefully towards the front of the vehicle.



101816

❏ Remove:

- the retaining clips (**6**) from the injectors,
- the injectors (**7**) .

❏ Insert the blanking plugs.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: injector clip on injector rail**.

❏ **parts always to be replaced: injector seal**.

❏ Refit:

- new seals on each injector,
- the injectors on the injector rail,
- a new clip on each injector.

II - REFITTING OPERATION

❏ Remove the blanking plugs.

❏ Fit the « injector rail-injector » assembly.

❏ Torque tighten the **injector rail bolts (9 N.m)**.

III - FINAL OPERATION

❏ Connect:

- the injector connectors,
- the fuel supply union onto the injector rail,

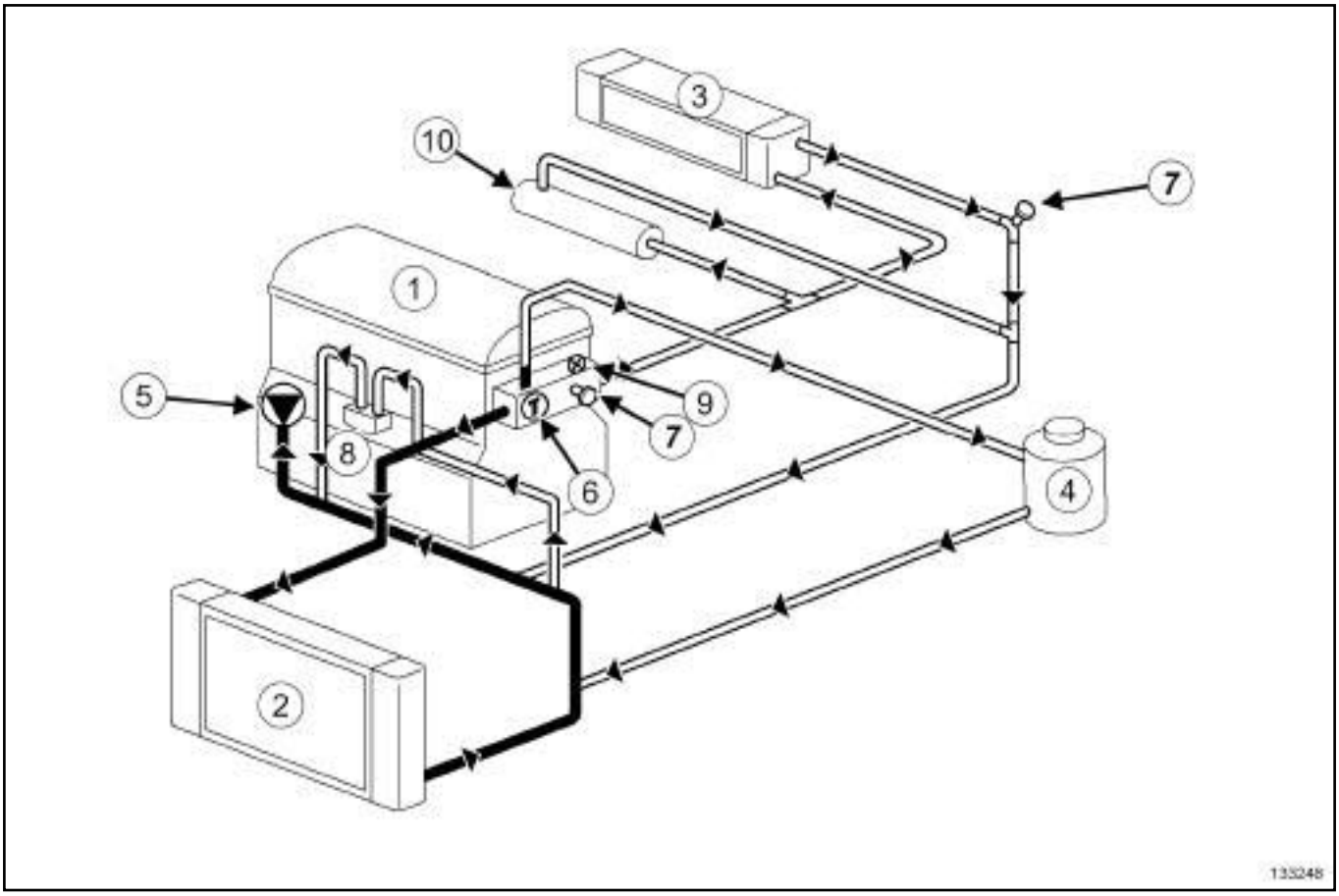
❏ Refit the injector rail protector.

❏ Torque tighten the two **injector rail protector nuts (21 N.m)**.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Engine cooling system: Operating diagram

K9K, and 796



133248

(**1**)	Engine
(**2**)	Cooling radiator
(**3**)	Heater radiator
(**4**)	Expansion bottle
(**5**)	Water pump
(**6**)	Thermostat
(**7**)	Bleed screw
(**8**)	Oil-water heat exchanger
(**9**)	Temperature switch
(**10**)	EGR

Vehicles in the current range have cooling systems with the following basic specifications:

- hermetically-sealed pressurised circuit (expansion chamber valve),
- circuit using a type "D" coolant,
- passenger compartment heating system via a "heater matrix" type radiator under the dashboard.

I - GRADE AND QUANTITY OF COOLANT

Engine	Quantity (litres)	Grade
K4M	Approximately 5.45 (version with AC) Approximately 4.5 (version without AC)	**GLACEOL RX (TYPE D)** Use coolant only.
K9K		

Special notes:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for very cold countries

II - THERMOSTAT

Engine	Start of opening (°C)	End of opening (°C)
K4M	89	99 ± 2
K9K		

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

Note:

There are two procedures for checking the cooling system:

- the procedure using the
- the procedure using the

Expansion bottle cap valve rating:

Expansion bottle cap with ...	Valve rating
... a brown circle	**1.2 bar**
... a yellow marking	**1.4 bar**
... a white marking	**1.6 bar**
... a grey marking	**1.8 bar**

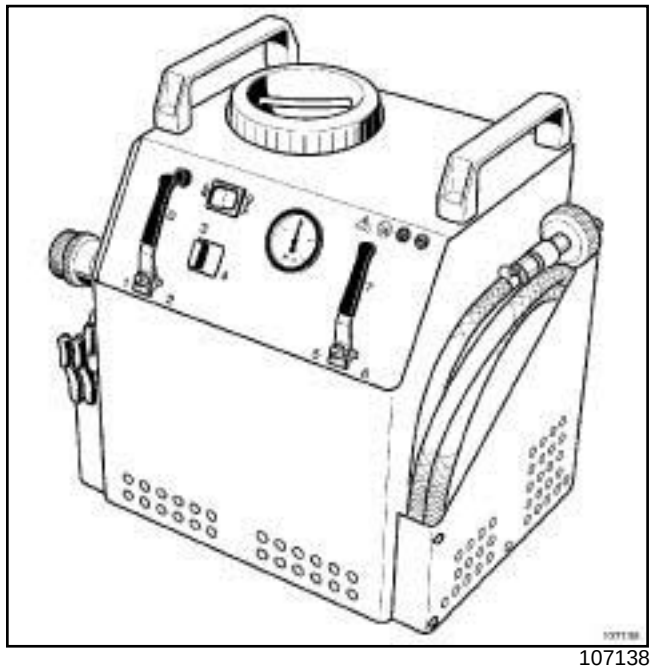
I - CHECKING THE COOLING SYSTEM USING THE TOOL (MOT. 1700)

❑

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

1 - Checking the expansion bottle cap valve



107138

❑ Use the cooling system filling and diagnostic tool. Consult the user's manual for this tool (see **Cooling system filling and diagnostic tool: Use**) (Technical Note 3857A, 19A, Cooling).

2 - Checking the sealing of the cooling circuit

❑ Use the cooling system filling and diagnostic tool. Consult the user's manual for this tool (see **Cooling system filling and diagnostic tool: Use**) (Technical Note 3857A, 19A, Cooling).

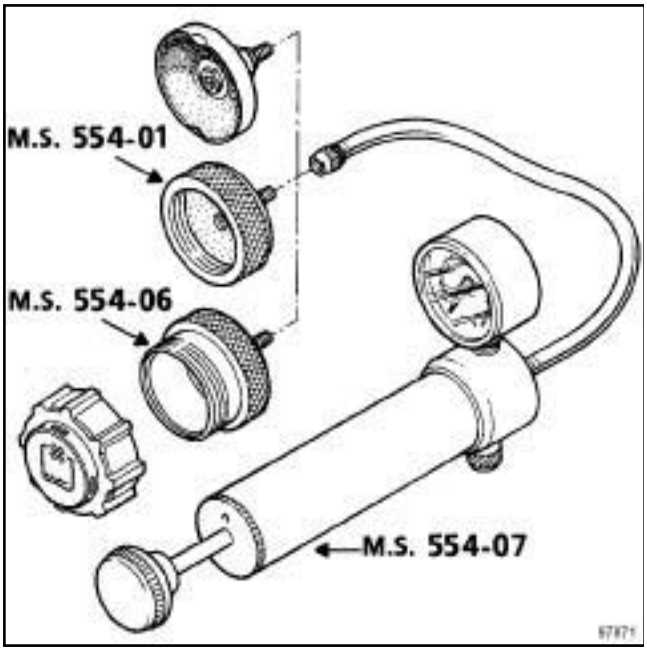
II - CHECKING THE COOLING SYSTEM USING THE TOOL (MS. 554-07)

❑

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

1 - Checking the expansion bottle cap valve



97871

❏ Fit onto the tester, the adapter **(Ms. 554-06)**.

❏ Fit the expansion bottle cap to the adapter **(Ms. 554-06)**.

> Note:
>
> The pressure should not drop; if it does, look for the leak.

❏ Pump with the, the pressure should stabilise at the expansion bottle cap valve rating with a test tolerance of ± **0.1 bar.**

2 - Checking the sealing of the cooling circuit

❏ Replace the expansion bottle cap with the adapter **(Ms. 554-01)**.

❏ Connect on the adapter **(Ms. 554-01)** the tool.

❏ Pump with theto put the cooling circuit under pressure.

❏ Stop pumping at **0.1 bar** below the valve rating for the expansion bottle cap valve.

> Note:
>
> The pressure should not drop; if it does, look for the leak.

❏ Gradually unscrew the union of theto decompress the cooling system then remove the adapter **(Ms. 554-01)** and refit the expansion bottle cap.

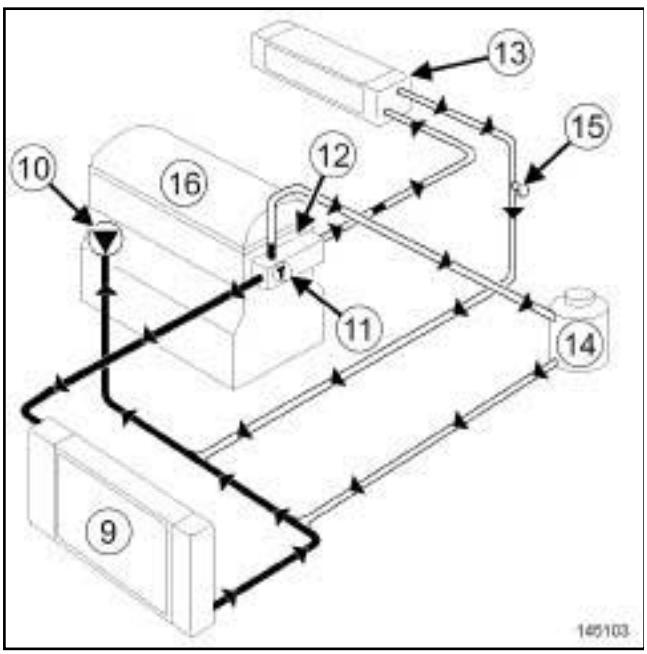
K4M

I - LIST OF COMPONENTS

The engine cooling system is composed of:

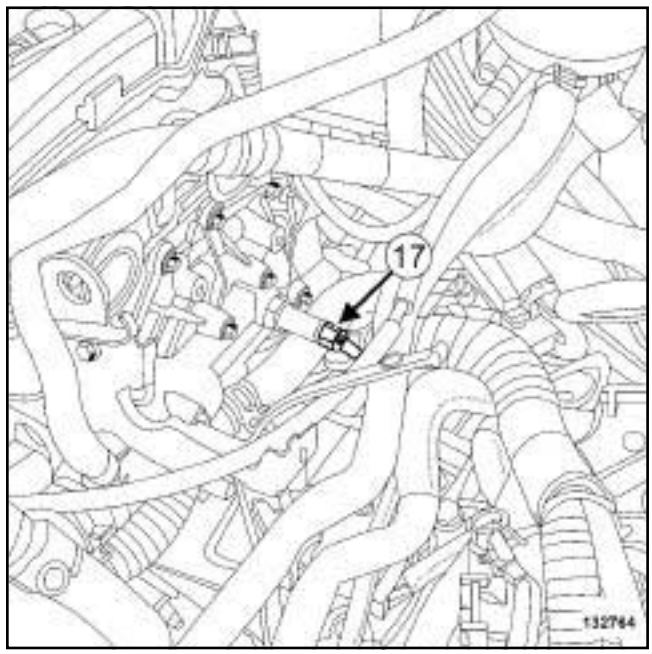
- an engine cooling fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-27**) ,
- a cooling radiator (see **19A**, **Cooling**, **Cooling radiator: Removal - Refitting**, page **19A-9**) ,
- a coolant pump (see **19A**, **Cooling**, **Coolant pump: Removal - Refitting**, page **19A-13**) ,
- a thermostat (see **19A**, **Cooling**, **Thermostat: Removal - Refitting**, page **19A-19**) ,
- a water chamber (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-22**) ,
- a coolant pump inlet pipe (see **19A**, **Cooling**, **Coolant pump inlet pipe: Removal - Refitting**, page **19A-34**) ,
- an expansion bottle (see **19A**, **Cooling**, **Expansion bottle: Removal - Refitting**, page **19A-38**) ,
- a coolant temperature sensor (see **19A**, **Cooling**, **Coolant temperature sensor: Removal - Refitting**, page **19A-40**) .

II - LOCATION OF COMPONENTS



145103

(**9**) Cooling radiator
(**10**) Water pump
(**11**) Thermostat
(**12**) Water chamber
(**13**) Heater radiator
(**14**) Expansion bottle
(**15**) Bleed screw
(**16**) Engine



132764

(**17**) Coolant temperature sensor

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Car. 1363	Set of trim removal levers.

Equipment required
coolant recovery tray
compressed air nozzle

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

I - DRAINING

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the expansion bottle cap,
- the engine undertray.

❏ Remove the front bumper (see **Front bumper assembly: Exploded view**) (55A, Exterior protection).

❏ Position the **coolant recovery tray** under the vehicle.

❏ Remove the cooling radiator bottom hose clip using theoror **(Mot. 1448)**.

❏ Open the cooling system by removing the cooling radiator bottom hose using the tool **(Car. 1363)**.

❏ Use a **compressed air nozzle** to blow air into the system through the expansion bottle opening to remove as much coolant as possible.

II - CLEANING

❏ Fill the cooling system with water through the expansion bottle.

❏ Let the water run until the water collected from the cooling radiator bottom hose becomes clear.

❏ Use a **compressed air nozzle** to blow air into the system through the expansion bottle opening to remove as much coolant as possible.

❏ Refit the cooling radiator bottom hose.

III - FILLING

❏

Note:

There are two procedures for filling the cooling system:

- the method using the tool, is recommended by Renault. It saves a considerable amount of time because it does not require the cooling system bleed screws to be opened,
- the procedure without a special tool.

1 - Filling procedure with the tool (Mot. 1700)

❏ Fill the cooling system with engine coolant recommended by the manufacturer (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) using the tool. Consult the user's manual for this tool (see) (Technical Note 3857A, 19A, Cooling).

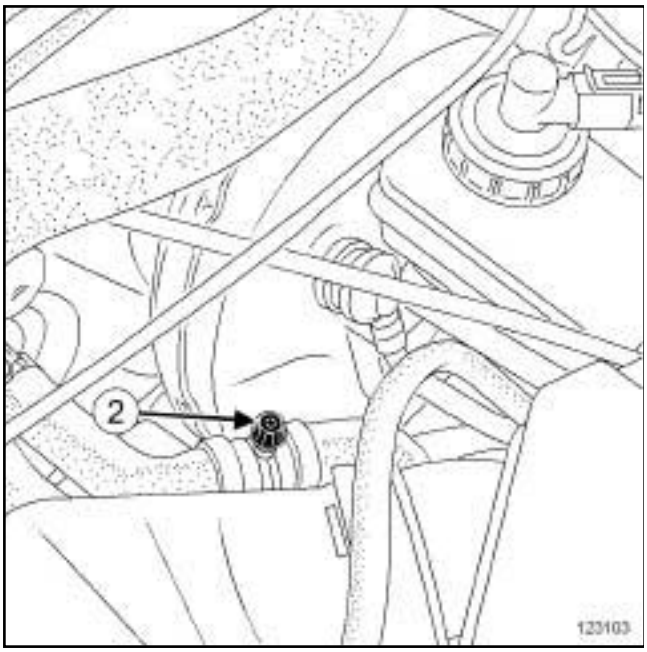
2 - Filling method without special tools

❏

WARNING

It is essential to open all of the bleed screws to remove as much as air as possible in the cooling system. Failure to perform this procedure may prevent the cooling system from filling properly and may damage the engine.

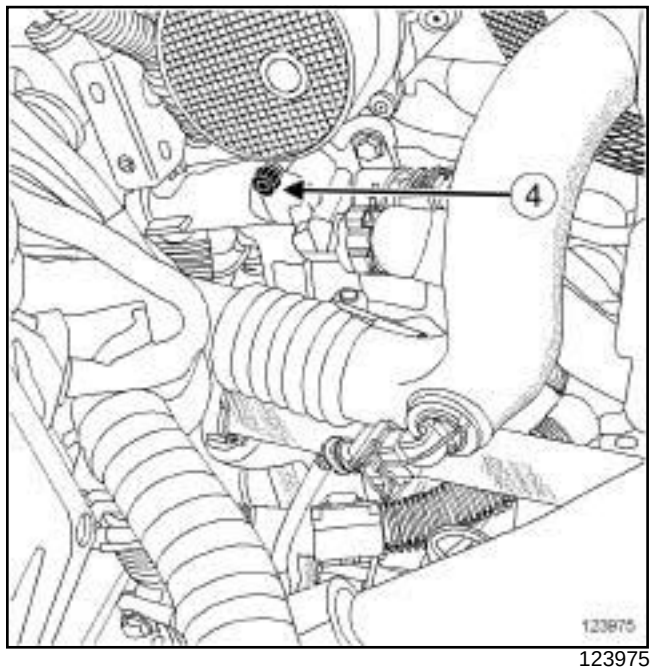
K4M



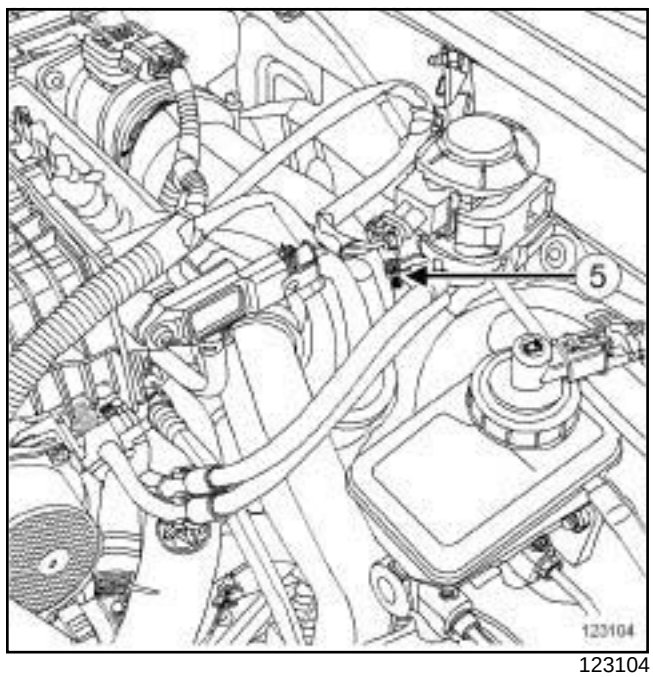
123103

❑ Open the bleed screw (**2**) .

K9K



123975



123104

❑ Open the bleed screws (**4**) and (**5**) .

❑ Fill the cooling system with engine coolant recommended by the manufacturer (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) via the expansion bottle until it overflows.

❑ Close all the bleed screws as soon as the coolant starts to flow in a continuous stream.

❏ Pressurise the system using the toolto check that there are no leaks (see **19A**, **Cooling**, **Engine cooling system: Check**, page **19A-3**) .

❏ Refit the expansion bottle cap.

❏ Clean any surfaces soiled by the coolant.

IV - BLEEDING

❏

WARNING
Do not open the bleed screw whilst the engine is running; this would damage the engine.

Start the engine.

K4M

❏ Maintain the engine speed at **2,500 rpm** until the engine cooling fan starts for the third time (time required for automatic degassing).

K9K

❏ Maintain the engine speed at **1500 rpm** varying the engine speed rapidly (until the maximum engine speed is reached) 2 to 3 times approximately every **2 minutes** until the engine cooling fan starts for the second time.

❏ Check that the heating is operating correctly.

❏ Let the engine cool until it reaches a coolant temperature below **50°C**.

❏ Make sure the coolant fluid level is at the « Maximum » mark.

❏ Refit the expansion bottle cap.

V - FINAL OPERATION

❏ Remove the **coolant recovery tray**.

❏ Refit the engine undertray.

❏ Refit the front bumper (see **Front bumper assembly: Exploded view**) (55A, Exterior protection).

K4M

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Car. 1363	Set of trim removal levers.

IMPORTANT
When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

WARNING
When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

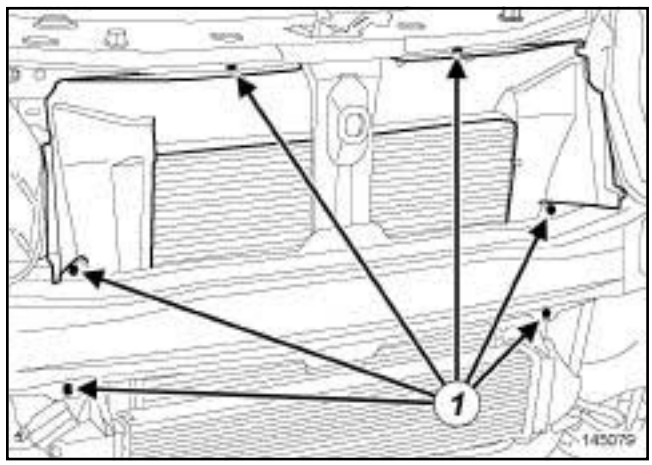
❑ Remove:

- the engine undertray,
- the front bumper (see **Front bumper assembly: Exploded view**) (55A, Exterior protection),
- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-25**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-27**) .

❑ Drain the engine cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

II - REMOVAL OPERATION

AIR CONDITIONING

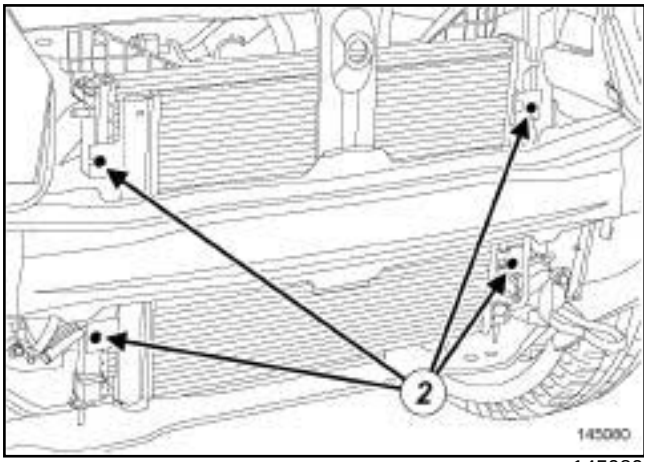


145079

❑ Remove:

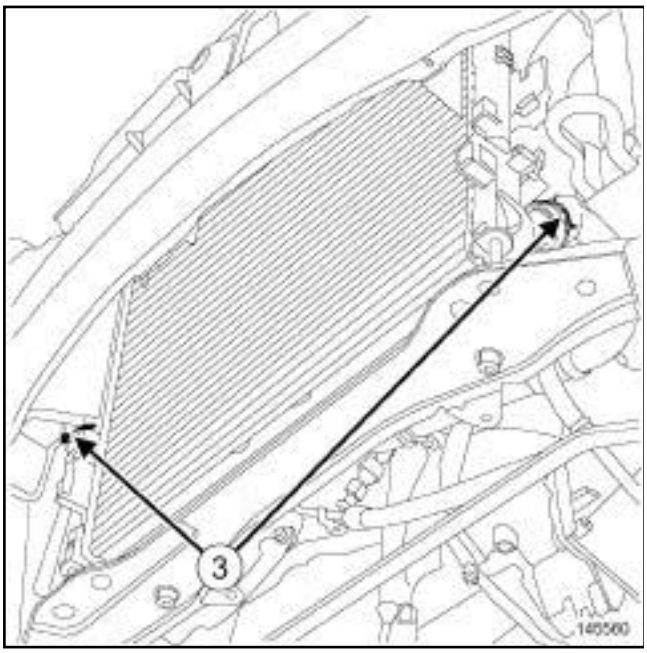
- the air deflector mounting pins (**1**) ,
- the air deflector.

❑ Attach the condenser to the front impact cross member using a safety strap.



145080

❏ Remove the condenser bolts (**2**) .



145560

❏ Remove the cooling radiator hose clips (**3**) using the tool **(Mot. 1448)**.

❏ Disconnect the cooling radiator hoses using the **(Car. 1363)**.

❏ Remove the engine cooling radiator from above the vehicle.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the cooling radiator hose clips.

II - REFITTING OPERATION

❏ Proceed in the reverse order to removal.

❏ Refill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.
Car. 1363	Set of trim removal levers.

IMPORTANT
When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

WARNING
When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

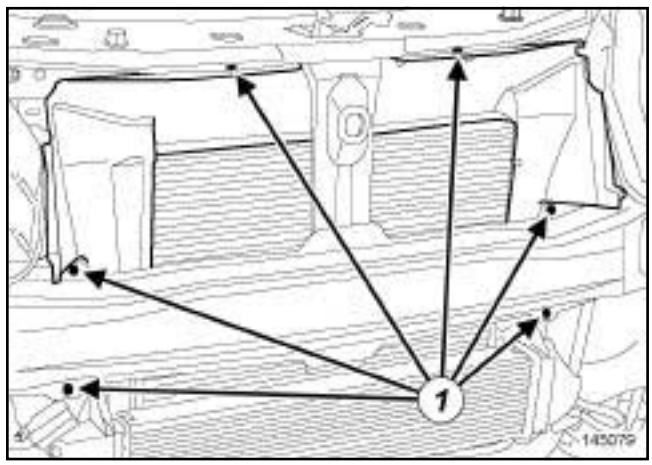
❑ Remove:

- the engine undertray,
- the front bumper (see **Front bumper assembly: Exploded view**) (55A, Exterior protection),
- the engine cover,
- the air intake sleeve,
- the intercooler (see **12B**, **Turbocharging**, **Intercooler: Removal - Refitting**, page **12B-8**) ,
- the fan assembly (see **19A**, **Cooling**, **Engine cooling fan assembly: Removal - Refitting**, page **19A-27**) .

❑ Drain the engine cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

II - REMOVAL OPERATION

AIR CONDITIONING

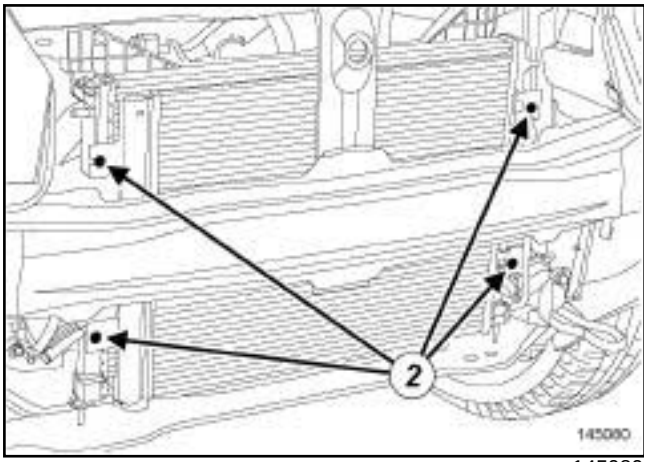


145079

❑ Remove:

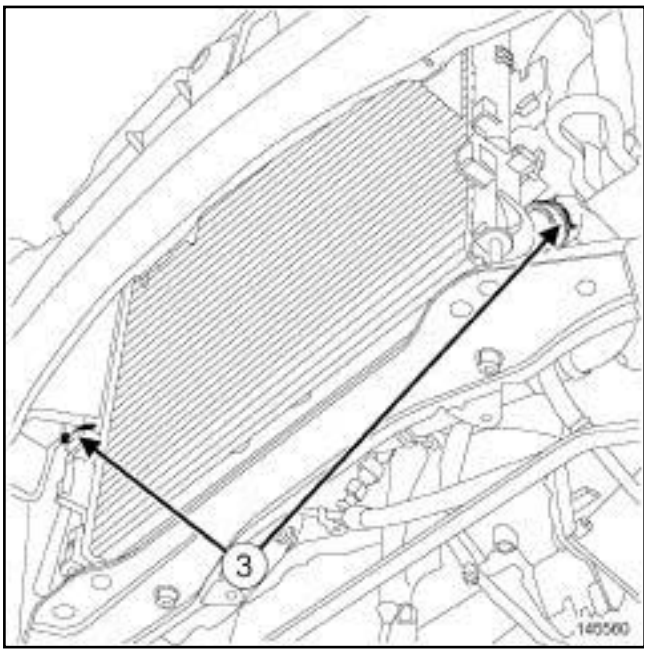
- the air deflector mounting pins (**1**) ,
- the air deflector.

❑ Attach the condenser to the front impact cross member using a safety strap.



145080

❏ Remove the condenser bolts (**2**) .



145560

❏ Remove the cooling radiator hose clips (**3**) using the tool **(Mot. 1448)**.

❏ Disconnect the cooling radiator hoses using the **(Car. 1363)**.

❏ Remove the engine cooling radiator from above the vehicle.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the cooling radiator hose clips.

II - REFITTING OPERATION

❏ Proceed in the reverse order to removal.

❏ Refill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

K9K, and 796

Tightening torques ▽	
bolts of the coolant pump	**10 N.m**
inner timing cover bolts	**9 N.m**
alternator bolts	**21 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Wear heat protective gloves during the operation.

IMPORTANT
The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

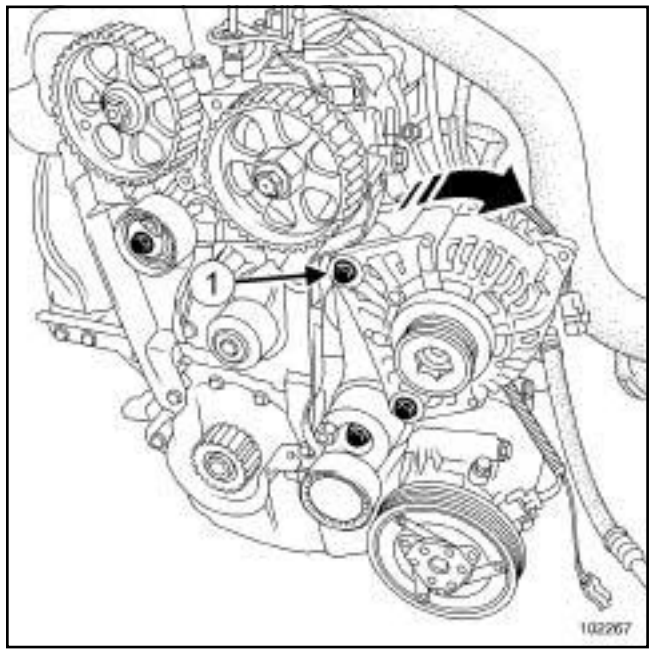
- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Remove the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❏ Remove:

- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) .



102267

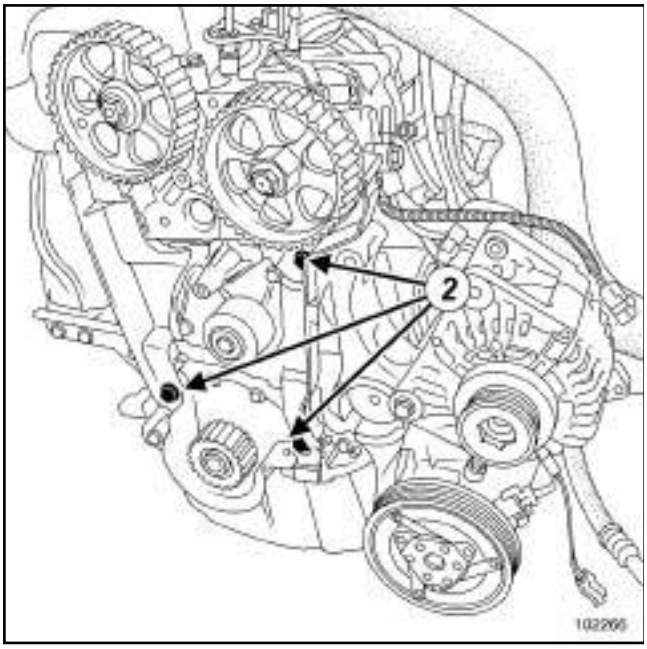
❏ Disconnect the electrical connections from the alternator.

❏ Remove the alternator upper bolt (**1**) .

❏ Loosen the alternator lower bolt.

❏ Tilt the alternator forward.

K9K, and 796

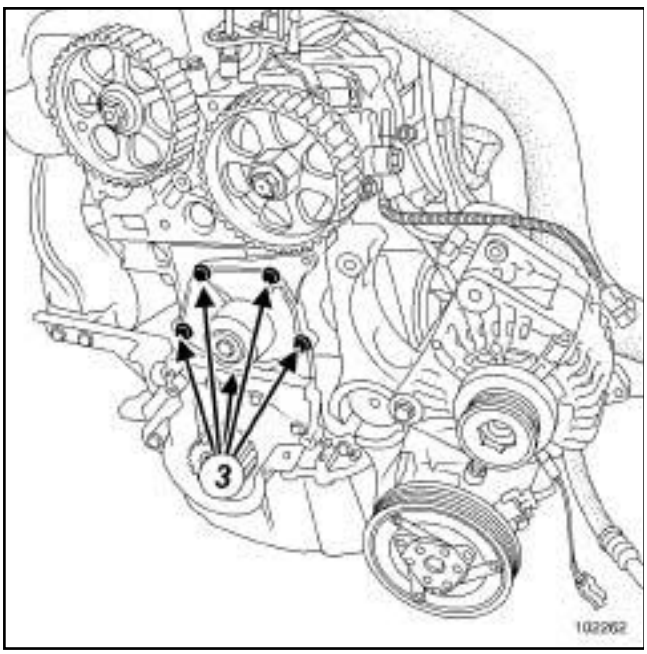


102266

❑ Remove:

- the inner timing cover bolts (**2**) ,
- the inner timing cover.

II - REMOVAL OPERATION



102262

❑ Remove:

- the coolant pump bolts (**3**) ,
- the coolant pump,
- the coolant pump seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❑ **parts always to be replaced: coolant pump seal**.

❑ Use **SURFACE CLEANER** (see) (04B, Consumables - Products) to clean and degrease:

- the coolant pump sealing face if it is to be reused,
- the cylinder block gasket face.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Apply **SUPER CLEANER FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the areas to be cleaned.

❑ Leave for approximately ten minutes.

❑ Remove the residue using a wooden spatula.

❑ Complete the cleaning of the parts using an abrasive pad.

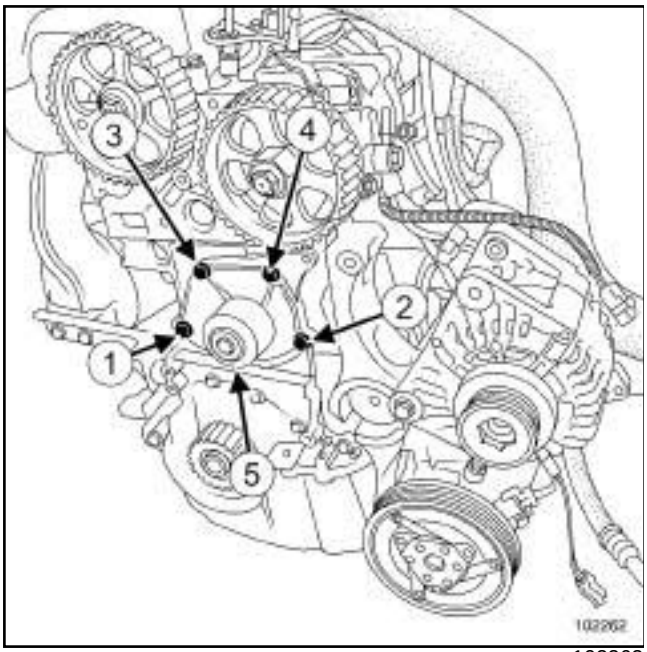
WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease the joint faces.

❑ Always replace the coolant pump seal.

K9K, and 796

II - REFITTING OPERATION



102262

❑ Refit:

- the coolant pump fitted with a new seal,
- the coolant pump bolts.

❑ Torque tighten in order **(1) (2) (3) (4) (5)** the **bolts of the coolant pump (10 N.m)**.

❑ Apply one or two drops of FRENETANCHE (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the coolant pump bolts.

III - FINAL OPERATION

❑ Refit the inner timing cover.

❑ Tighten to torque the **inner timing cover bolts (9 N.m)**.

❑ Refit the alternator.

❑ Torque tighten the **alternator bolts (21 N.m)**.

❑ Connect the alternator electrical connections.

❑ Refit:

- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) .

❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❑ Refit the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

Coolant pump: Removal - Refitting

K4M

Tightening torques ▽	
coolant pump M8 bolt	**27 N.m**
coolant pump M6 bolts	**10 N.m**

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

WARNING

Prepare for the flow of fluid, and protect the surrounding components.

WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to **-25°C ± 2** for cold and temperate countries,
- protection down to **-40°C ± 2** for "extreme cold" countries.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

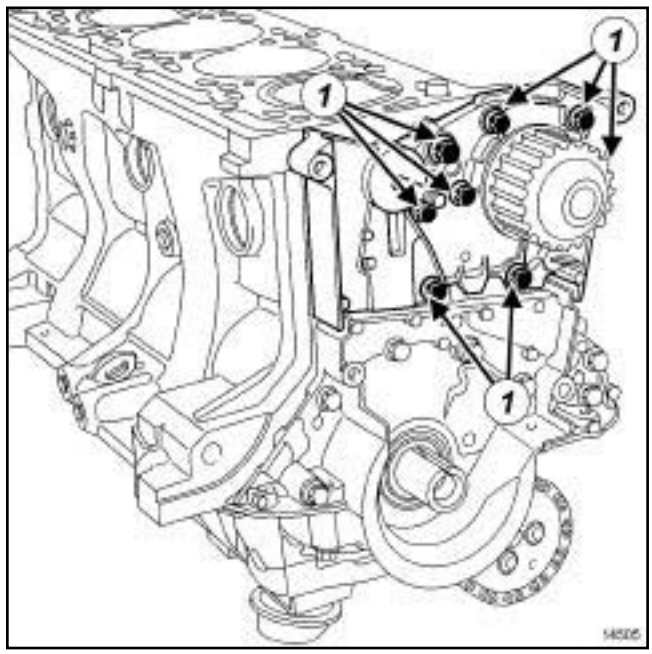
❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove:

- the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres),
- the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
- the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) .

❑ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

II - REMOVAL OPERATION



14505

❑ Remove:

- the coolant pump bolts (**1**) ,
- the coolant pump.

K4M

REFITTING

I - REFITTING PREPARATION OPERATION

❑

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Wear goggles with side protectors for this operation.

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Use **SUPER CLEANING AGENT FOR JOINT FACES** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean:

- the coolant pump sealing face if it is to be reused,
- the cylinder block gasket face.

❑ Apply the product to the surfaces to be cleaned.

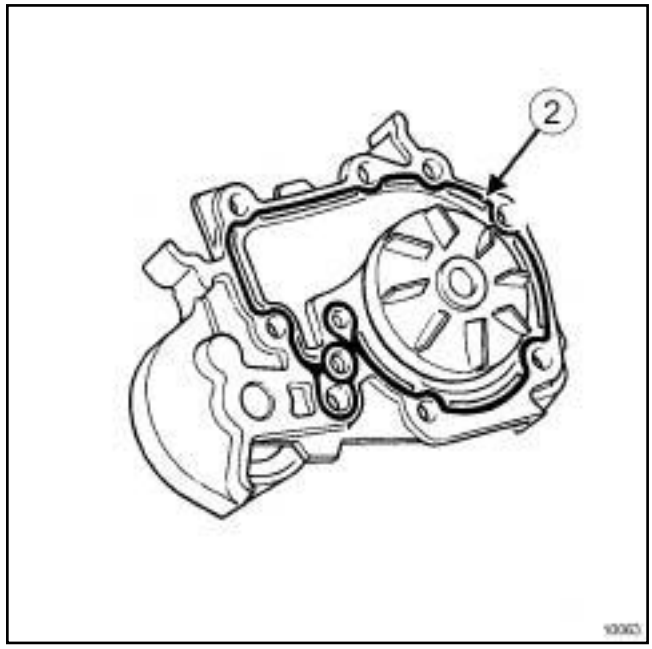
❑ Leave for approximately ten minutes.

❑ Remove the residue using a wooden spatula.

❑ Complete the cleaning of the parts using an abrasive pad.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease the joint faces.



10063

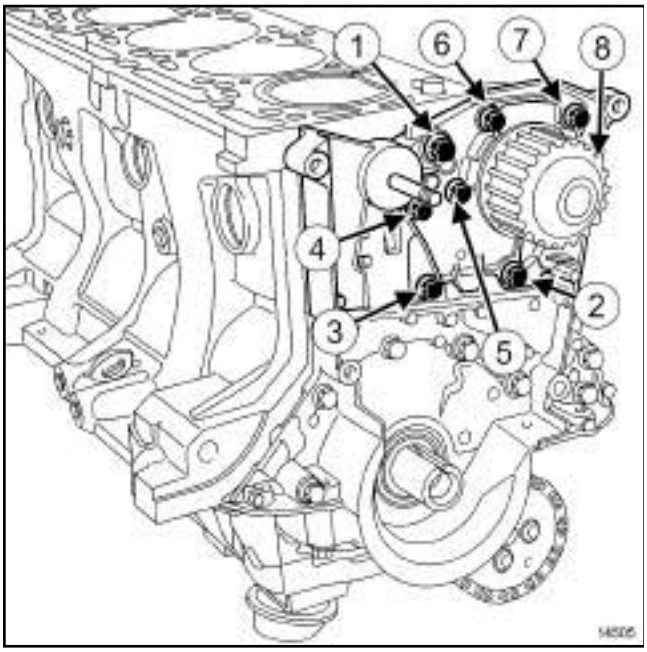
❑

WARNING
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

❑ Apply at (**2**) a bead of **RESIN ADHESIVE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) **0.6** to **1 mm** wide.

K4M

II - REFITTING OPERATION



14505

- ❏ Apply one to two drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the coolant pump bolts (**1**) and (**4**) .
- ❏ Refit the coolant pump.
- ❏ Fit the coolant pump bolts in order until contact is made.
- ❏ Torque tighten in order:
  - the **coolant pump M8 bolt (27 N.m)** (**1**) .
  - the **coolant pump M6 bolts (10 N.m)** (**2**) to (**8**) .

III - FINAL OPERATION

- ❏ Refit:
  - the timing belt (see **11A**, **Top and front of engine**, **Timing belt: Removal - Refitting**, page **11A-17**) ,
  - the accessories belt (see **11A**, **Top and front of engine**, **Accessories belt: Removal - Refitting**, page **11A-2**) ,
  - the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).
- ❏ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .
- ❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❏ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K9K

❑ The thermostat is integral with the coolant outlet unit. The coolant outlet unit must be replaced to replace it (see **19A**, **Cooling**, **Water chamber: Removal - Refitting**, page **19A-22**) .

K4M

Special tooling required	
Mot. 1448	Remote operation pliers for hose clips.

IMPORTANT

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

REMOVAL

I - REMOVAL PREPARATION OPERATION

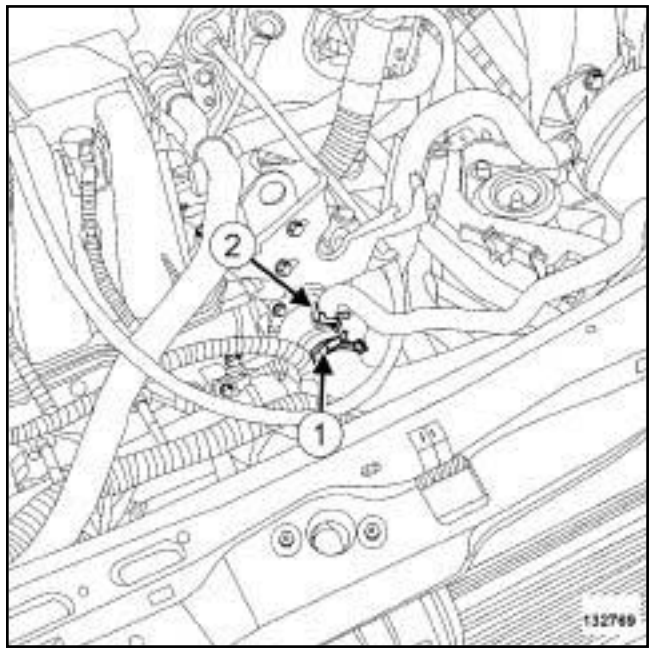
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) ,
- the engine undertray bolts,
- the engine undertray.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



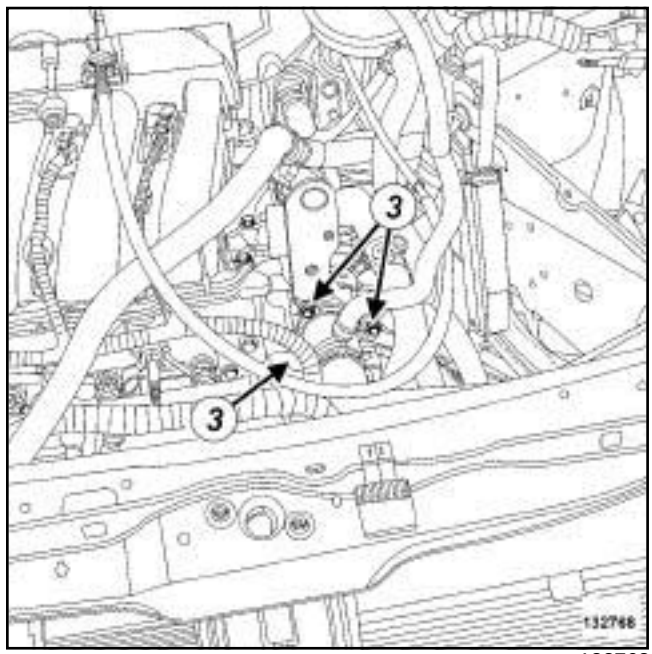
132769

❏ Using the **(Mot. 1448)** ororremove:

- the cooling radiator top hose clip (**1**) ,
- the clip (**2**) from the expansion bottle hose.

❏ Disconnect from the thermostat cover:

- the cooling radiator top hose,
- the expansion bottle hose.

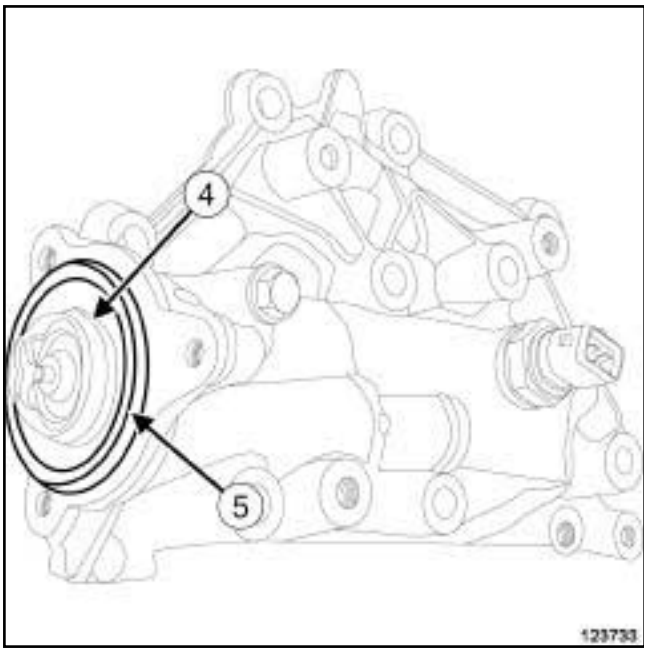


132768

❏ Remove:

- the thermostat cover bolts (**3**) ,

- the thermostat cover.



123733

❑ Remove:

- the thermostat (**4**) ,
- the thermostat seal (**5**) .

REFITTING

I - REFITTING PREPARATION OPERATION

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the thermostat housing.

❑ The thermostat seal must be replaced.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit:

- a new seal on the thermostat,
- the thermostat,
- the thermostat cover.

❑ Connect the following to the thermostat cover:

- the expansion bottle hose,
- the cooling radiator top hose.

❑ Using the **(Mot. 1448)** orорfit:

- the expansion bottle hose clip,
- the cooling radiator top hose clip.

III - FINAL OPERATION

❑ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❑ Refit:

- the engine undertray,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

K9K, and 796

Tightening torques ▽	
water chamber bolts	**11 N.m**
expansion bottle nuts	**8 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray.

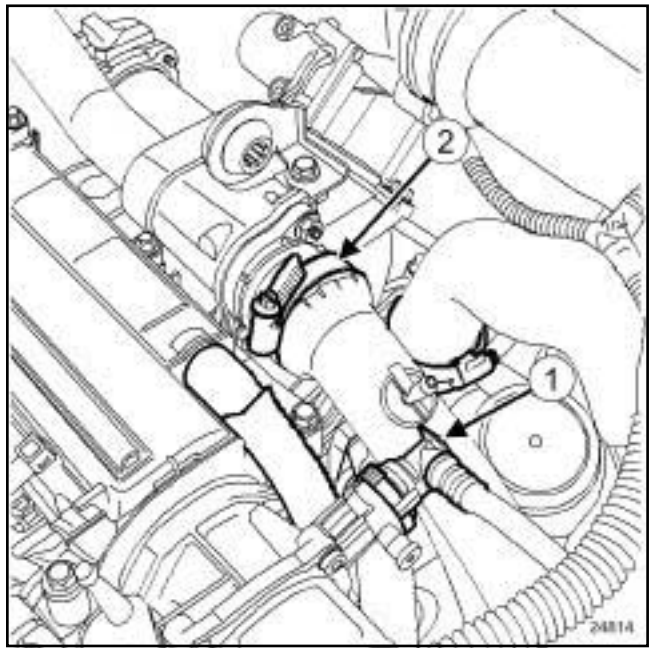
❏ Remove the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❏ Remove:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the expansion bottle nuts.

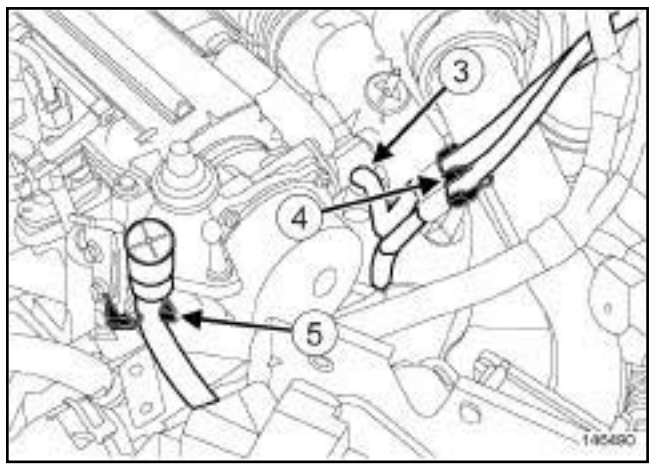
❏ Move aside the expansion bottle.



24814

❏ Disconnect:

- the union (**1**) on the vacuum pump,
- the air duct between the intercooler and the EGR assembly at (**2**) .



146490

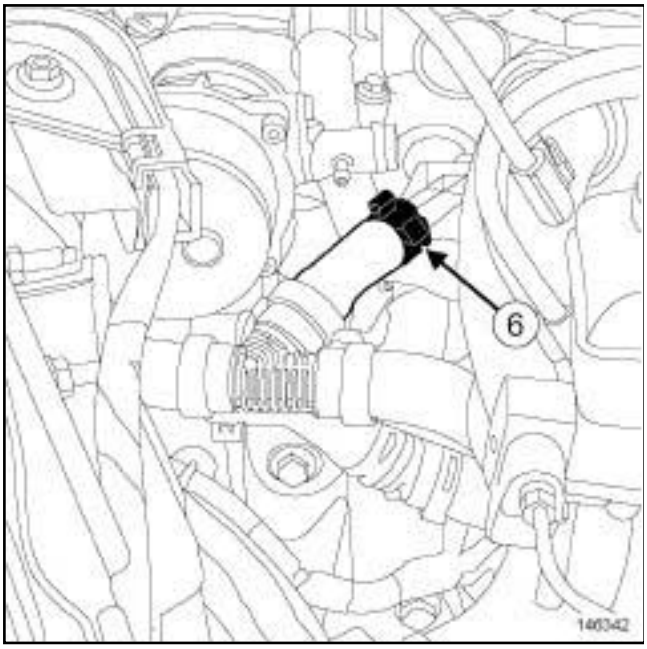
❏ Disconnect the EGR solenoid valve pipe at (**3**) .

❏ Unclip:

- the EGR solenoid valve pipes at (**4**) ,
- the gearbox breather pipe at (**5**) .

❏ Move aside the air duct between the intercooler and the EGR assembly.

K9K, and 796

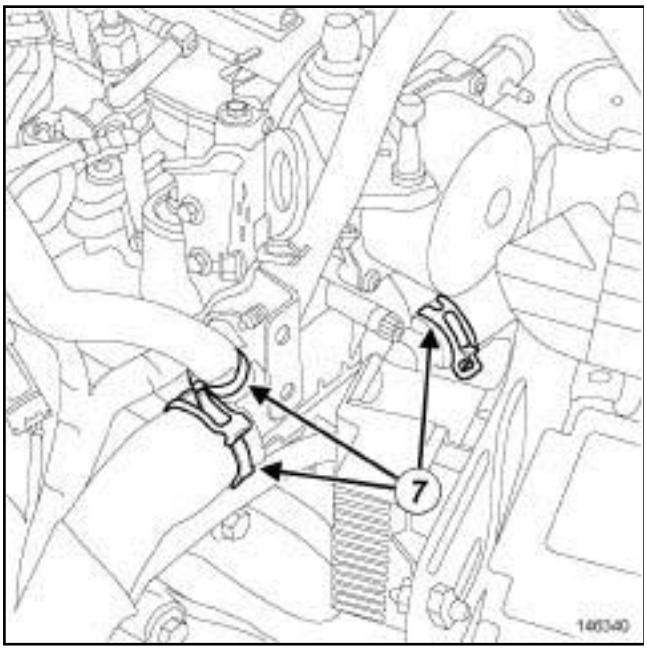


146342

❏ Disconnect the EGR assembly outlet pipe at (**6**) .

❏ Move the EGR assembly outlet pipe aside.

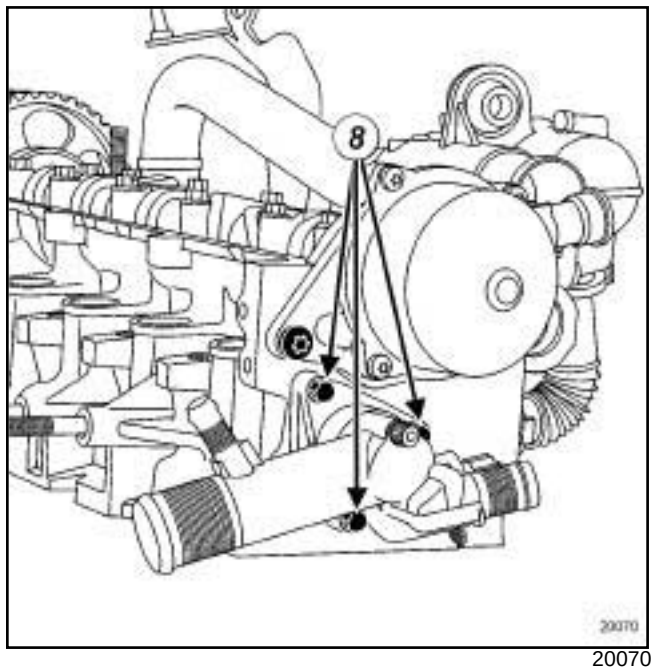
❏ Disconnect the coolant temperature sensor connector.



146340

❏ Disconnect the cooling hoses on the water chamber at (**7**) .

II - REMOVAL OPERATION



20070

❏ Remove:

- the water chamber bolts (**8**) ,
- the water chamber,
- the water chamber seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Cylinder head coolant outlet unit seal**.

❏ Use **SURFACE CLEANER** (see) to clean and degrease:

- the cylinder head joint face,
- the water chamber seal housing if it is to be reused.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

K9K, and 796

II - REFITTING OPERATION

❏ Refit:

- a new water chamber seal in the water chamber housing,
- the water chamber.

❏ Torque tighten the **water chamber bolts (11 N.m)**.

❏ Connect:

- the cooling hoses to the water chamber,
- the coolant temperature sensor connector,
- the EGR assembly outlet pipe,

❏ Position the air duct between the intercooler and the EGR assembly.

❏ Connect:

- the air duct on the EGR assembly,
- the union to the vacuum pump.

❏ Connect the EGR solenoid valve pipe to the vacuum pump.

❏ Clip on:

- the breather pipe from the gearbox,
- the EGR solenoid valve pipes.

❏ Position the expansion bottle.

❏ Torque tighten the **expansion bottle nuts (8 N.m)**.

III - FINAL OPERATION

❏ Refit the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❏ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine undertray,
- the engine cover.

❏ Fill and bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K4M

Tightening torques ▽	
coolant outlet unit bolts (initial torque)	**4 N.m**
water chamber bolts	**12 N.m**

REMOVAL

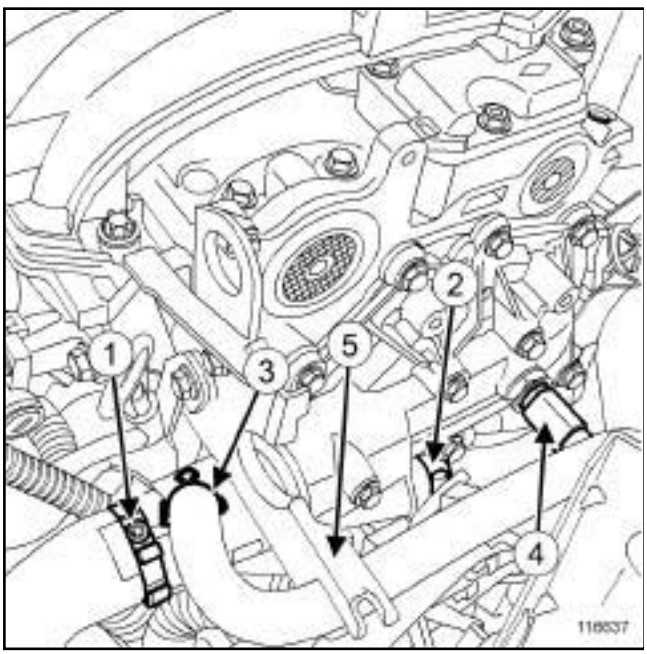
I - OPERATION FOR REMOVAL OF PART CONCERNED

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .



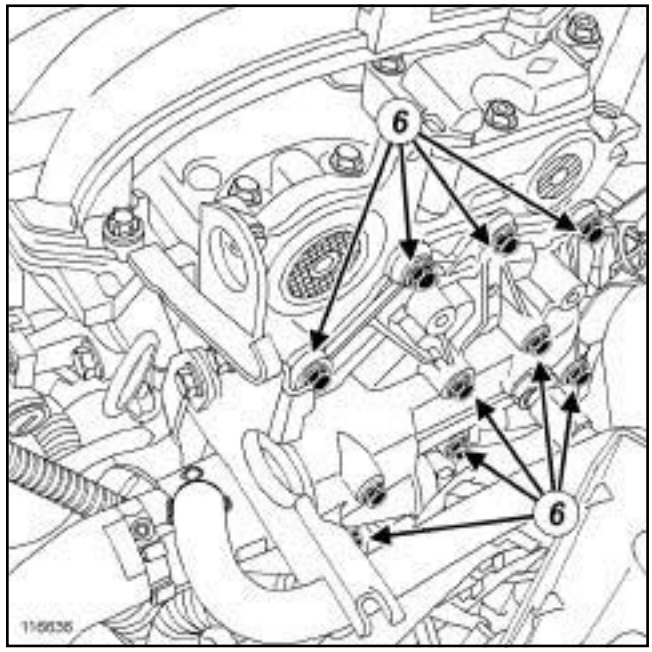
116637

❏ Disconnect:

- the radiator top hose (**1**) from the water chamber,
- the passenger compartment heater hose (**2**) ,
- the expansion bottle hose (**3**) ,
- the coolant temperature sensor (**4**) .

❏ Unclip the hoses from their support at (**5**) .

II - REMOVAL OPERATION



116636

❏ Remove:

- the water chamber bolts (**6**) ,
- the water chamber.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: Cylinder head coolant outlet unit seal**

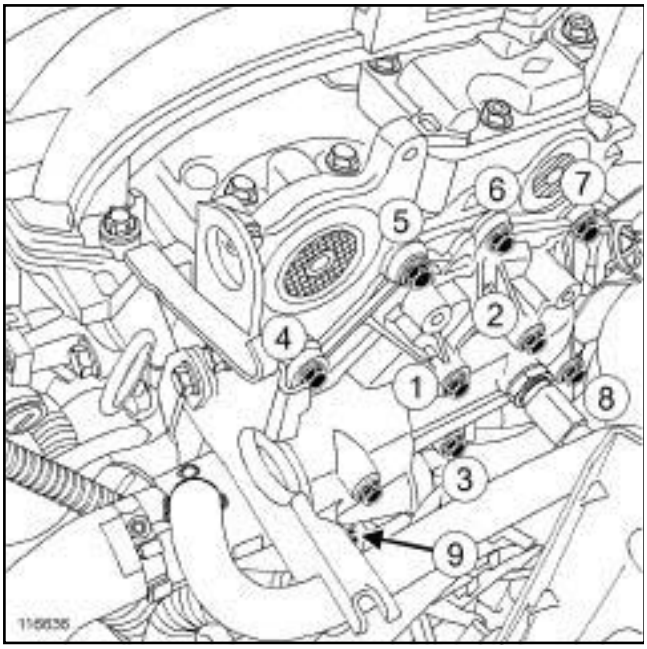
> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❏ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease:

- the cylinder head joint face,
- the water chamber joint face, if being reused.

II - REFITTING OPERATION

❏ Refit the water chamber.



116636

❏ Screw on the water chamber bolts without tightening them.

❏ Torque tighten in order:

- the **coolant outlet unit bolts (initial torque) (4 N.m)**,
- the **water chamber bolts (12 N.m)**.

III - FINAL OPERATION

❏ Connect:

- the coolant temperature sensor,
- the expansion bottle hose,
- the passenger compartment heater hose,
- the top hose to the water chamber.

❏ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

❏ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

K4M

REMOVAL

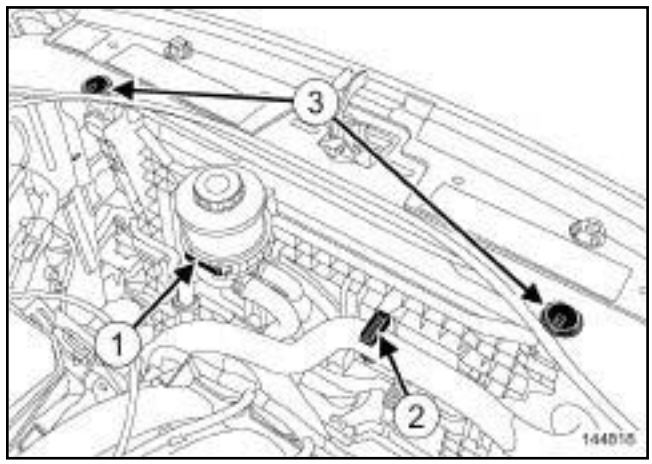
I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

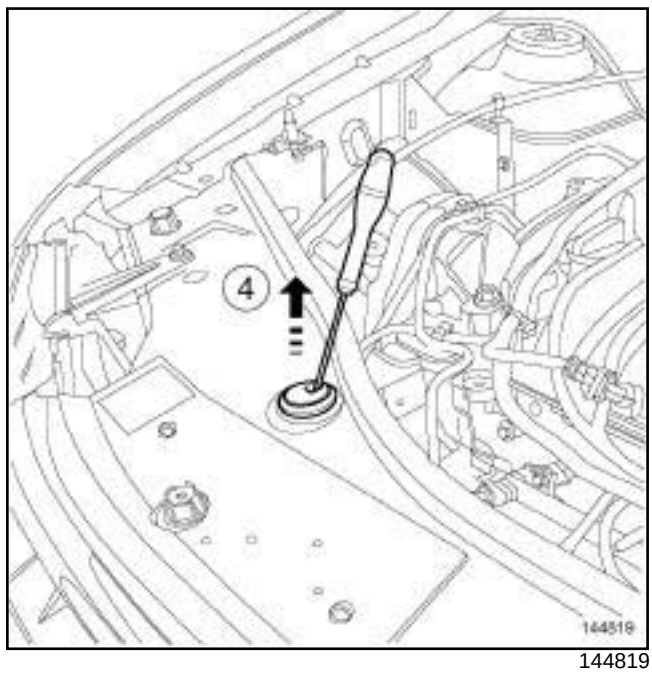
❑ Remove:

- the injector rail protector (see **13B**, **Diesel injection**, **Injector rail: Removal - Refitting**, page **13B-25**) ,
- the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

II - REMOVAL OPERATION



144818



144819

❑ Unclip:

- the power-assisted steering hoses on the fan assembly,
- the power-assisted steering fluid reservoir from its support at (**1**) ,
- the engine coolant hose at (**2**) .

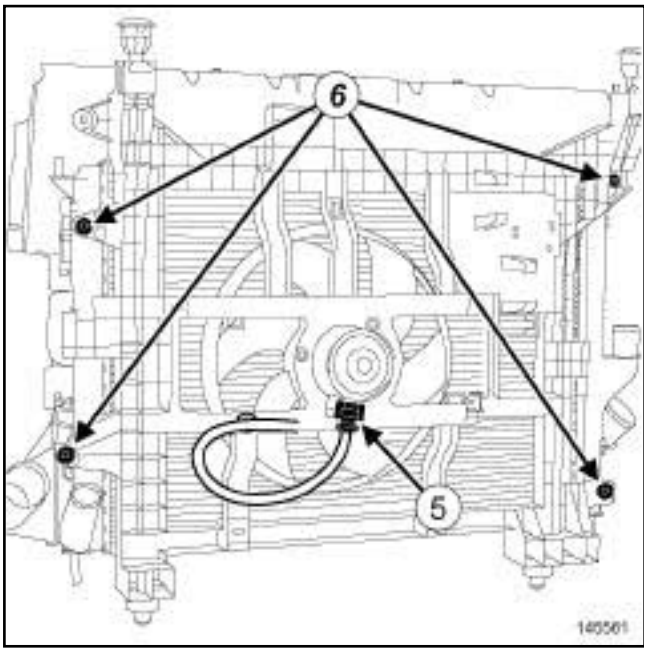
❑ Press on the clips of the centring pins (**3**) on the engine cooling fan assembly using a screwdriver and pull them according to the direction of the arrow (**4**) .

❑ Secure the power-assisted steering fluid reservoir to the engine.

❑ Remove the power assisted steering fluid reservoir bracket.

K4M

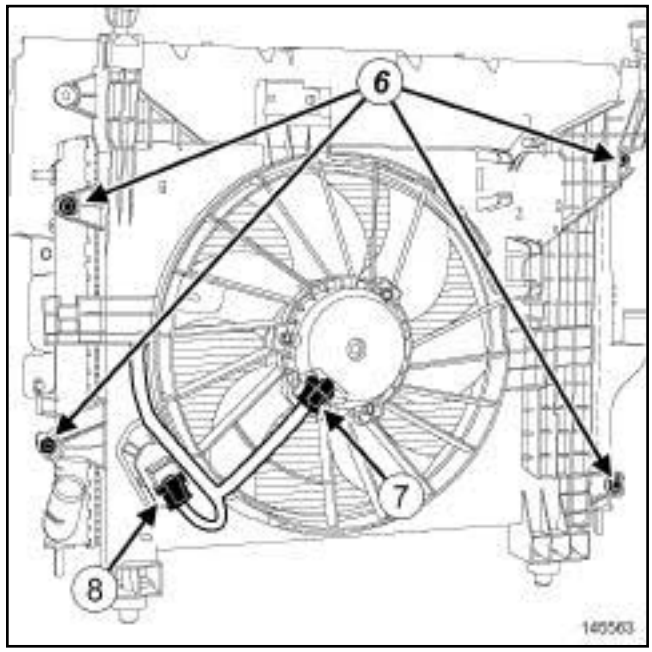
STANDARD HEATING RECIRCULATION



145561

- ❏ Disconnect the cooling fan assembly connector (**5**) .
- ❏ Unclip the engine cooling fan assembly wiring.
- ❏ Move aside the wiring of the engine cooling fan assembly.
- ❏ Remove the engine cooling radiator bolts (**6**) .

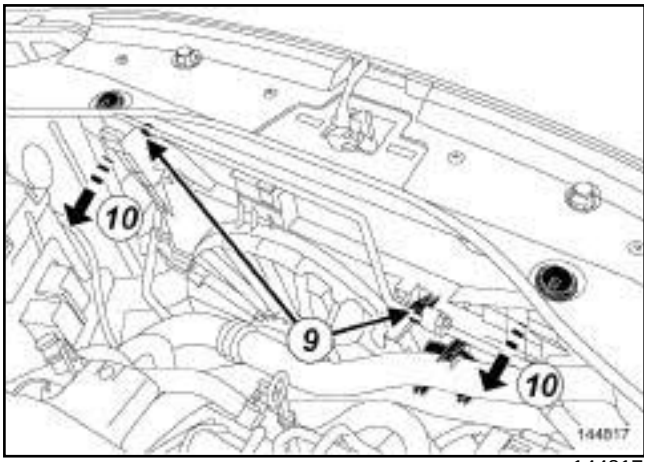
AIR CONDITIONING



145563

- ❏ Disconnect:
  - the engine cooling fan assembly connector (**7**) ,
  - the engine cooling fan assembly resistor connector (**8**) .
- ❏ Unclip the engine cooling fan assembly wiring.
- ❏ Move aside the wiring of the engine cooling fan assembly.
- ❏ Remove the engine cooling radiator bolts (**6**) .

K4M



144817

❑ Unclip the « condenser - expansion valve » connecting pipe at (**9**) .

WARNING
In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Pull the fan assembly according to the arrows (**10**) passing it under the «condenser - expansion valve » connecting pipe.

❑

Note:
Do not damage the cooling unit vanes (radiator, condenser, etc.) during handling.

❑ Remove the engine cooling fan assembly from above the vehicle.

In the event of replacement

❑ Remove from the fan assembly:

- the power-assisted steering hose clips,
- the wiring clip.

REFITTING

I - REFITTING PREPARATION OPERATION

In the event of replacement

❑ Refit on the fan assembly:

- the power-assisted steering hose clips,
- the wiring clip.

II - REFITTING OPERATION

❑ Proceed in the reverse order to removal.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

III - CHECKING THE OPERATION OF THE FAN UNIT

❑ Start the engine.

❑ Disconnect the coolant temperature sensor connector.

❑ Check the operation of the fan assembly.

❑ Connect the coolant temperature sensor connector.

❑ Switch off the engine.

K9K

REMOVAL

I - REMOVAL PREPARATION OPERATION

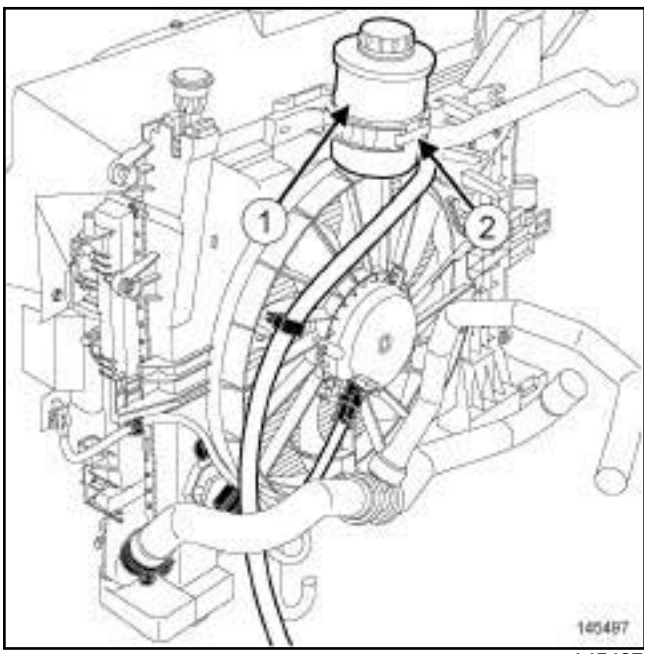
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

- the engine cover,
- the air intake sleeve,
- the front bumper (see **Front bumper assembly: Exploded view**) (55A, Exterior protection).

STANDARD HEATING RECIRCULATION



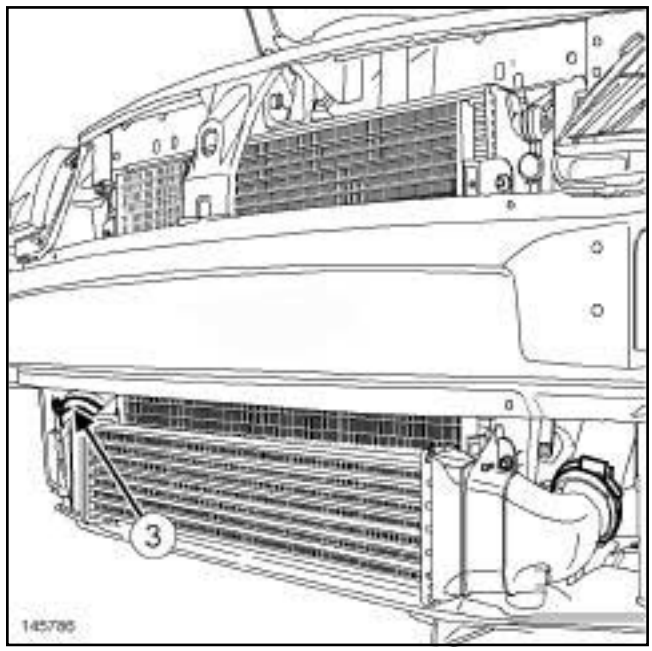
145497

❏ Unclip:

- the power-assisted steering hoses on the fan assembly,
- the power-assisted steering fluid reservoir (**1**) from its support at (**2**) .

❏ Secure the power-assisted steering fluid reservoir to the engine.

❏ Remove the power assisted steering fluid reservoir bracket.

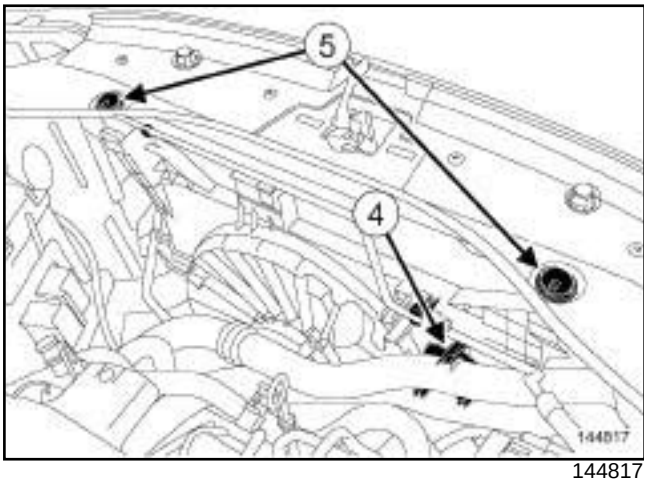


145786

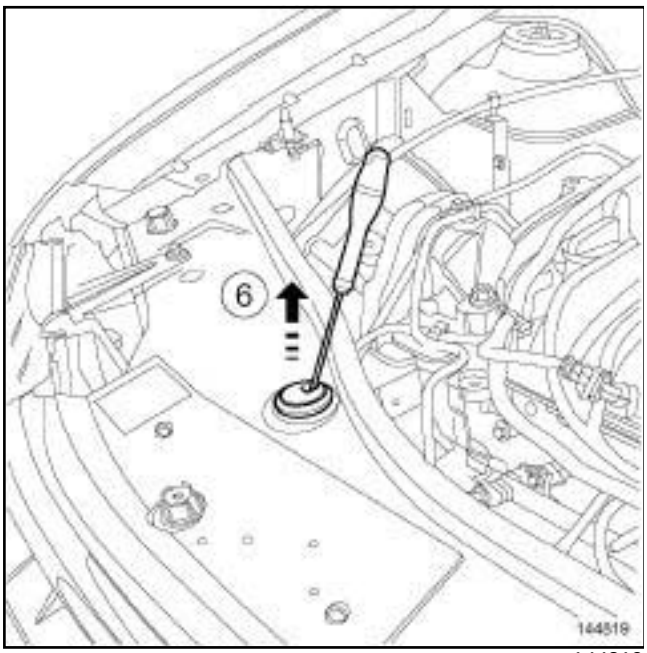
❏ Disconnect the intercooler duct at (**3**) .

K9K

II - REMOVAL OPERATION



144817



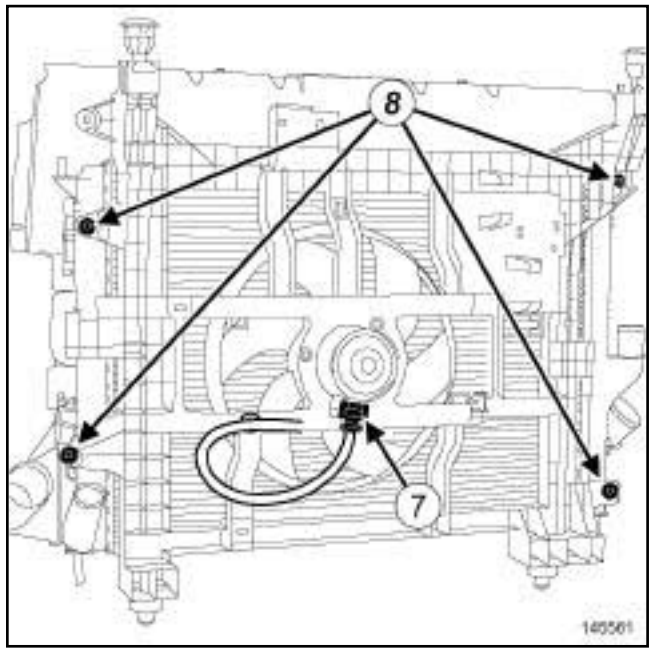
144819

❑ Unclip the following from the support (**4**) :

- the intercooler duct on the fan assembly,
- the engine coolant hose.

❑ Press on the clips of the centring pins (**5**) on the engine cooling fan assembly using a screwdriver and pull them according to the direction of the arrow (**6**) .

STANDARD HEATING RECIRCULATION



145561

❑ Disconnect the cooling fan assembly connector (**7**) .

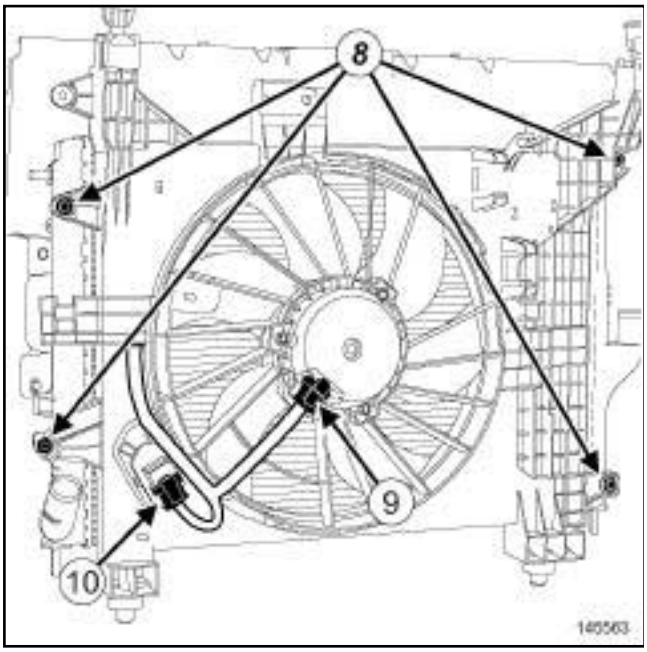
❑ Unclip the engine cooling fan assembly wiring.

❑ Move aside the wiring of the engine cooling fan assembly.

❑ Remove the engine cooling radiator bolts (**8**) .

K9K

AIR CONDITIONING



145563

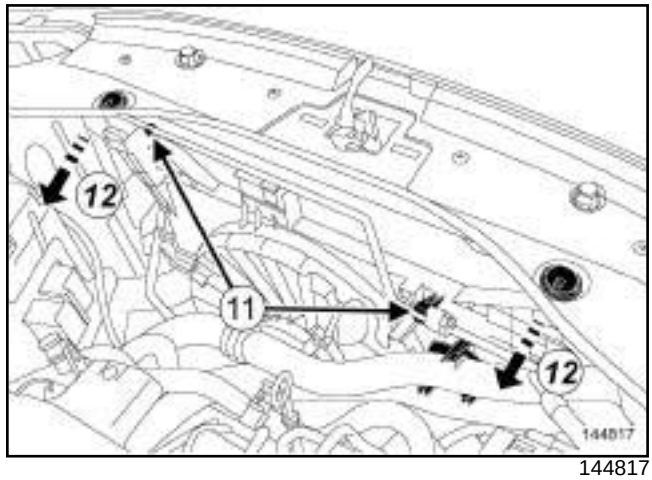
❑ Disconnect:

- the engine cooling fan assembly connector (**9**) ,
- the engine cooling fan assembly resistor connector (**10**) .

❑ Unclip the engine cooling fan assembly wiring.

❑ Move aside the wiring of the engine cooling fan assembly.

❑ Remove the engine cooling radiator bolts (**8**) .



144817

❑ Unclip the « condenser - expansion valve » connecting pipe at (**11**) .

WARNING

In order to avoid any refrigerant leaks, do not damage (deform, twist, etc.) the pipe.

❑ Pull the fan assembly according to the arrows (**12**) passing it under the « condenser - expansion valve » connecting pipe.

❑

Note:

Do not damage the cooling unit vanes (radiator, condenser, etc.) during handling.

❑ Remove the engine cooling fan assembly from above the vehicle.

In the event of replacement

❑ Remove from the fan assembly:

- the power-assisted steering hose clips,
- the wiring clip,
- the support of the intercooler duct and coolant hose on the fan assembly.

K9K

REFITTING

I - REFITTING PREPARATION OPERATION

In the event of replacement

❏ Refit on the fan assembly:

- the power-assisted steering hose clips,
- the wiring clip,
- the support of the intercooler duct and coolant hose on the fan assembly.

II - REFITTING OPERATION

❏ Proceed in the reverse order to removal.

❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

III - CHECKING THE OPERATION OF THE FAN UNIT

❏ Start the engine.

❏ Disconnect the coolant temperature sensor connector.

❏ Check the operation of the fan assembly.

❏ Connect the coolant temperature sensor connector.

❏ Switch off the engine.

Coolant pump inlet pipe: Removal - Refitting

K9K, and 796

Tightening torques ▽	
coolant pump inlet pipe bolt	**22 N.m**
accelerometer	**20 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
Wear heat protective gloves during the operation.

IMPORTANT
The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove:

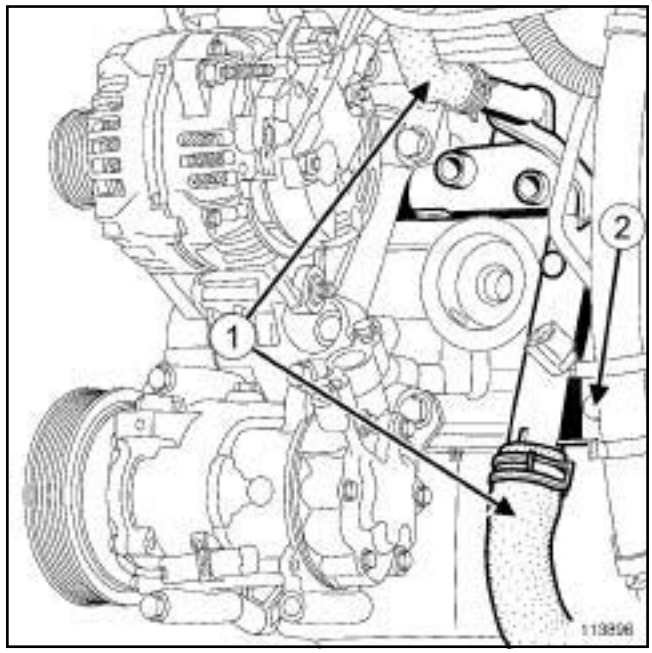
- the engine cover,
- the engine undertray bolts,
- the engine undertray.

❏ Remove the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❏ Drain the engine cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❏ Remove the oil-water heat exchanger (see **10A**, **Engine and cylinder block assembly**, **Oil-coolant heat exchanger: Removal - Refitting**, page **10A-37**) .

II - REMOVAL OPERATION



113896

❏ Disconnect:

- the coolant hoses (**1**) from the coolant pump inlet pipe,
- the accelerometer connector.

❏ Remove the accelerometer using.

❏ Remove:

- the water pump inlet pipe bolt (**2**) ,
- the coolant pump inlet pipe.
- the coolant pump inlet pipe seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: seal between coolant pump inlet pipe and coolant pump**

K9K, and 796

❑ Use **SURFACE CLEANER** (see) (04B, Consumables - Products) to clean and degrease:

- the coolant pump inlet pipe seal housing if it is being reused,
- the seal housing in the cylinder block.

WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

WARNING
Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

❑ Replace the removed clips.

II - REFITTING OPERATION

❑ Refit the coolant pump inlet pipe to the cylinder block.

❑ Torque tighten the **coolant pump inlet pipe bolt (22 N.m)**.

❑ Refit the accelerometer using the tool.

❑ Tighten to torque the **accelerometer (20 N.m)**.

❑ Connect:

- the accelerometer connector,
- the coolant hoses onto the coolant pump inlet pipe.

III - FINAL OPERATION

❑ Refit the oil-water heat exchanger (see **10A**, **Engine and cylinder block assembly**, **Oil-coolant heat exchanger: Removal - Refitting**, page **10A-37**) .

❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

❑ Refit the front bumper (see **Front bumper: Removal - Refitting**) (55A, Exterior protection).

❑ Refit:

- the engine undertray,
- the engine undertray bolts,
- the engine cover.

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

Coolant pump inlet pipe: Removal - Refitting

K4M

Tightening torques ▽	
coolant pump inlet pipe bolt	**22 N.m**

REMOVAL

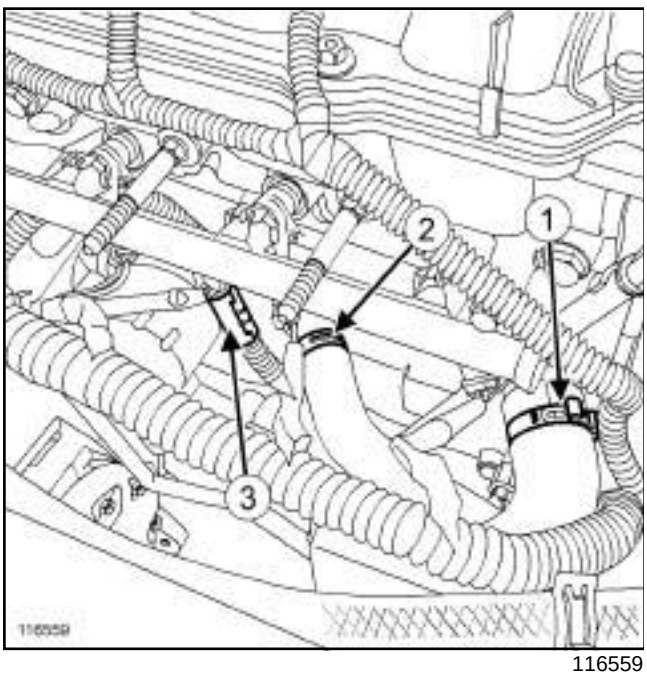
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Remove the injector rail protector.

❏ Drain the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .



116559

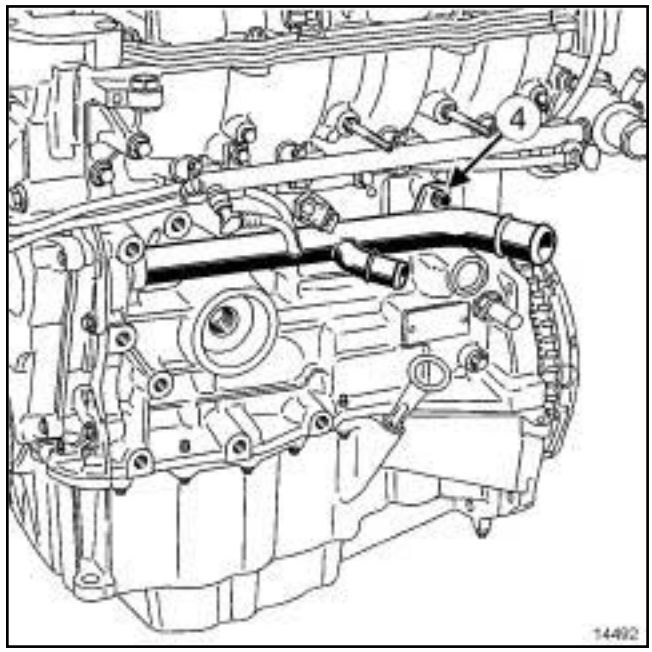
❏ Disconnect:

- the cooling radiator bottom hose (**1**) ,
- the heater hose (**2**) .

❏ Unclip the wiring on the coolant pump inlet pipe at (**3**) .

❏ Disconnect the connector from cylinder injector no. 3.

II - OPERATION FOR REMOVAL OF PART CONCERNED



14492

❏ Remove:

- the bolt (**4**) from the coolant pump inlet pipe,
- the coolant pump inlet pipe,
- the coolant pump inlet pipe seal.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: seal between coolant pump inlet pipe and coolant pump**

❏ Always replace the cooling hose clips.

II - REFITTING OPERATION FOR PART CONCERNED

❏ Refit the coolant pump inlet pipe fitted with a new seal.

❏ Torque tighten the **coolant pump inlet pipe bolt (22 N.m)**.

III - FINAL OPERATION

❏ Connect:

- the connector to cylinder injector no. 3.
- the heater hose on the coolant pump inlet pipe,
- the cooling radiator bottom hose.

❏ Clip the wiring onto the coolant pump inlet pipe.

K4M

- ❑ Refit the injector rail protector.
- ❑ Fill the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .
- ❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).
- ❑ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

Special tooling required	
Ms. 583	Pipe clamps.
Mot. 1448	Remote operation pliers for hose clips.

Tightening torques ▽	
expansion bottle nuts	**8 N.m**

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

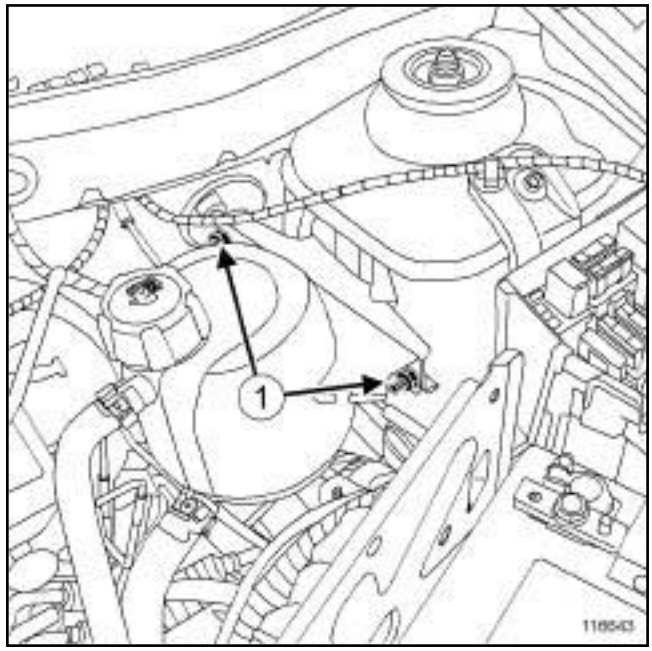
The system does not operate using pure water.

WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

REMOVAL

REMOVAL OPERATION



116643

❏ Remove the expansion bottle nuts (**1**) .

❏ Move aside the expansion bottle.

❏ Position hose clamps **(Ms. 583)** on the expansion bottle hoses.

❏ Remove the expansion bottle cap.

❏ Drain the coolant from the expansion bottle.

❏ Remove the following using the tool **(Mot. 1448)** or « CLIC » clip pliers:

- the clamp of the top hose of the expansion bottle,
- the clamp of the bottom hose of the expansion bottle.

❏ Disconnect:

- the expansion bottle bottom hose,
- the expansion bottle top hose.

❏ Remove the expansion bottle .

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the « CLIC » type clips.

II - REFITTING OPERATION

❏ Connect:

- the expansion bottle top hose,

- the expansion bottle bottom hose.

❏ Refit the following using the tool **(Mot. 1448)** or « CLIC » clip pliers:

- the clamp of the top hose of the expansion bottle,
- the clamp of the bottom hose of the expansion bottle.

❏ Fill the expansion bottle with coolant.

❏ Remove the hose clamps **(Ms. 583)**.

❏ Refit the expansion bottle.

❏ Torque tighten the **expansion bottle nuts (8 N.m)**.

III - FINAL OPERATION

❏ Top up the coolant level in the expansion bottle.

❏ Refit the expansion bottle cap.

❏ Bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

Coolant temperature sensor: Removal - Refitting

K9K

Tightening torques ▽	
expansion bottle nuts	**8 N.m**

IMPORTANT
Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT
The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING
Prepare for the flow of fluid, and protect the surrounding components.

REMOVAL

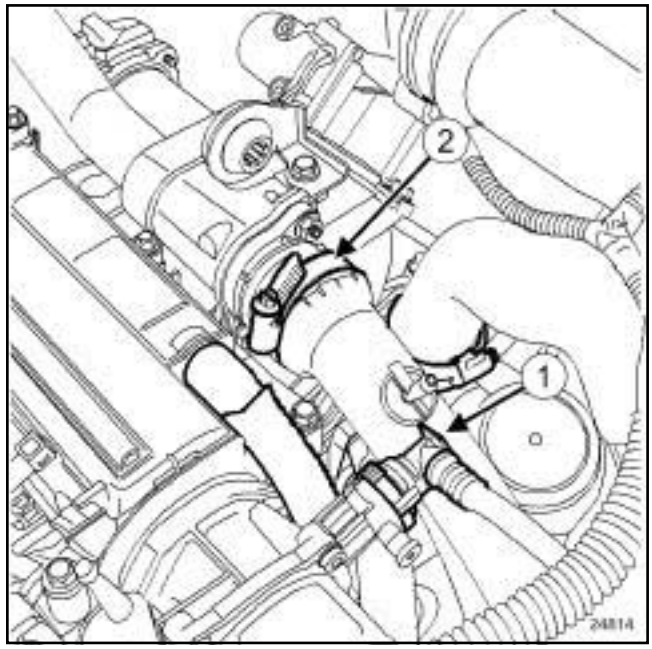
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) .

❏ Remove:

- the engine cover,
- the engine undertray bolts,
- the engine undertray,
- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the expansion bottle nuts.

❏ Move aside the expansion bottle.

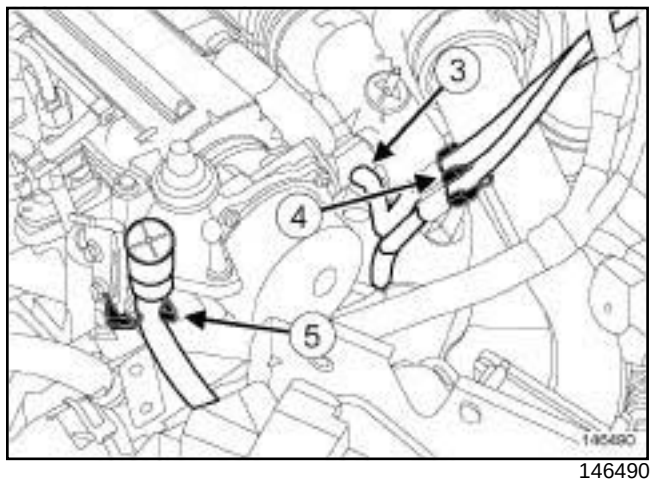


24814

❏ Disconnect:

- the union (**1**) on the vacuum pump,
- the air duct between the intercooler and the EGR assembly at (**2**) .

K9K, and 796



146490

❏ Disconnect the EGR solenoid valve pipe at (**3**) .

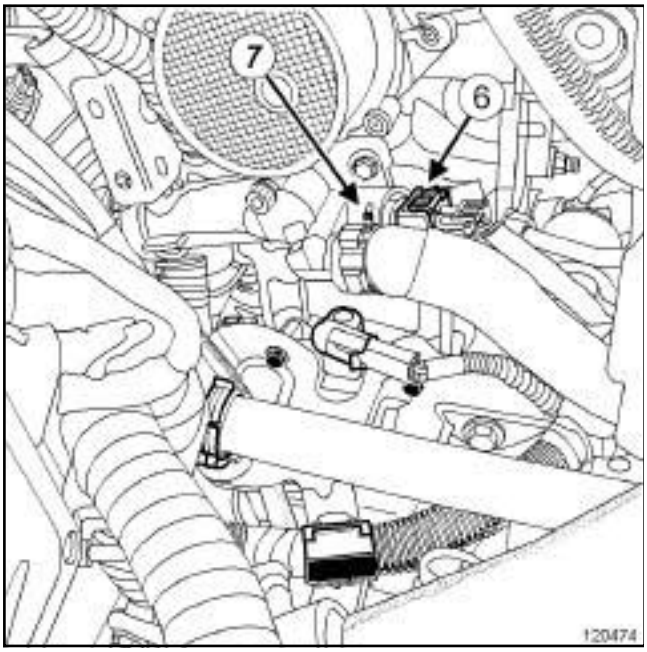
❏ Unclip:

- the EGR solenoid valve pipes at (**4**) ,
- the gearbox breather pipe at (**5**) .

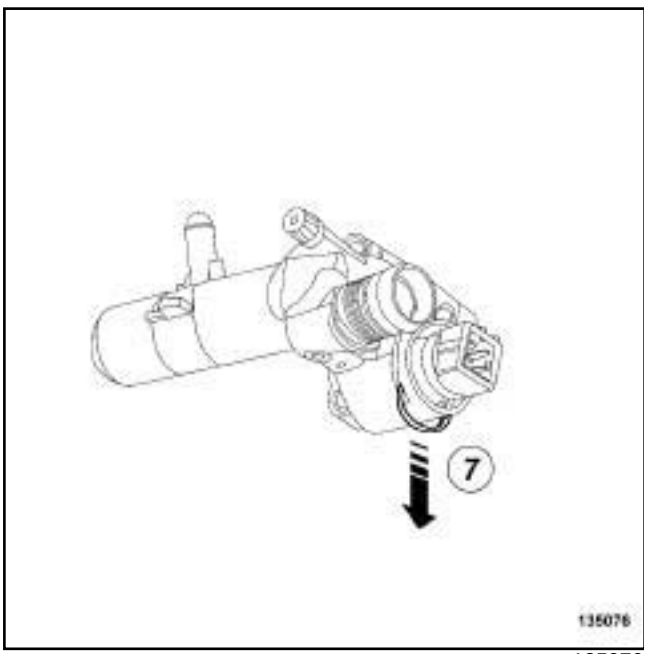
❏ Move aside the air duct between the intercooler and the EGR assembly.

K9K

II - REMOVAL OPERATION



120474



135076

❏ Disconnect the coolant temperature sensor connector (**6**) .

❏ Remove:

- the coolant temperature sensor retaining clip (**7**) ,
- the coolant temperature sensor,
- the coolant temperature sensor O-ring.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ **parts always to be replaced: coolant temperature sensor seal**.

❏ Use **SURFACE CLEANER** (see) to clean and degrease:

- the mating face of the coolant temperature sensor if it is to be reused,
- the coolant outlet unit.

II - REFITTING OPERATION

❏ Refit:

- a new coolant temperature sensor seal on the coolant temperature sensor,
- the coolant temperature sensor,
- the coolant temperature sensor clip.

❏ Connect the coolant temperature sensor connector.

III - FINAL OPERATION

❏ Position the air duct between the intercooler and the EGR assembly.

❏ Connect:

- the air duct on the EGR assembly,
- the union to the vacuum pump.

K9K, and 796

❏ Connect the EGR solenoid valve pipe to the vacuum pump.

❏ Clip on:

- the breather pipe from the gearbox,
- the EGR solenoid valve pipes.

❏ Position the expansion bottle.

❏ Torque tighten the **expansion bottle nuts (8 N.m)**.

❏ Refit:

- the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) ,
- the engine undertray,
- the engine undertray bolts,
- the engine cover.

K9K

❑ Perform the following operations:

- top up the cooling system,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

Coolant temperature sensor: Removal - Refitting

K4M

Tightening torques ▽	
coolant temperature sensor	30 N.m

IMPORTANT

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

WARNING

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

WARNING

The coolant helps to keep the engine running properly (heat exchange).

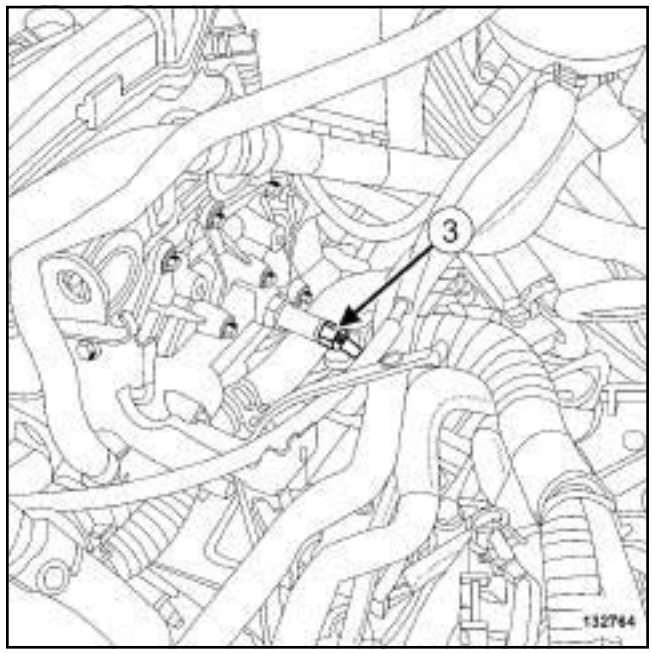
The system does not operate using pure water.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Remove the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

II - OPERATION FOR REMOVAL OF PART CONCERNED



132764

❑ Disconnect the coolant temperature sensor connector (**3**) .

❑ Remove the coolant temperature sensor.

REFITTING

I - REFITTING PREPARATION OPERATION

❑

Note:

Apply 1 to 2 drops of **FRENETANCHE** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to the coolant temperature sensor thread (only if the sensor is to be reused).

❑ Use **SURFACE CLEANER** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean and degrease the mating face of the coolant temperature sensor on the water chamber.

II - REFITTING OPERATION FOR PART CONCERNED

❑ Refit the coolant temperature sensor.

❑ Torque tighten the **coolant temperature sensor (30 N.m)**.

❑ Connect the coolant temperature sensor connector.

K4M

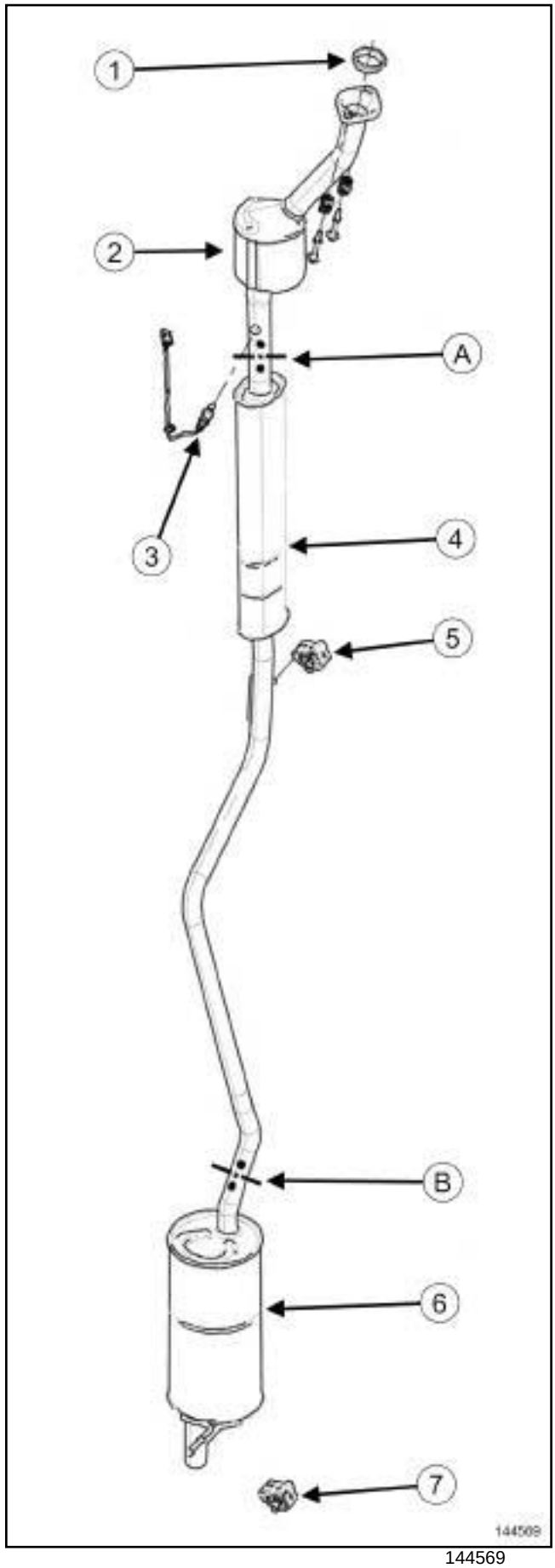
III - FINAL OPERATION

❑ Refit the air resonator (see **12A**, **Fuel mixture**, **Air resonator: Removal - Refitting**, page **12A-2**) .

❑ Perform the following operations:

- top up the coolant level,
- bleed the cooling system (see **19A**, **Cooling**, **Cooling system: Draining - Refilling**, page **19A-6**) .

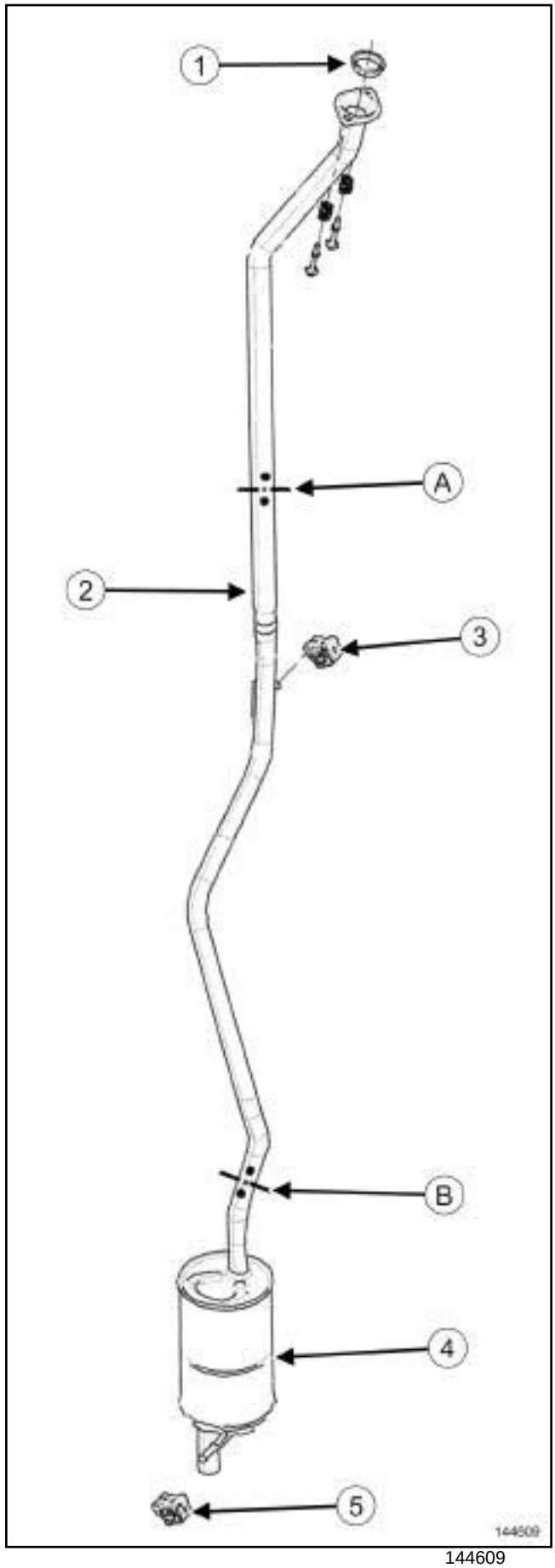
K4M



144569

(**A**)	Area to be cut A
(**B**)	Area to be cut B
(**1**)	Exhaust system sealing ring
(**2**)	Catalytic converter
(**3**)	Downstream oxygen sensor
(**4**)	Expansion chamber
(**5**)	Expansion chamber rubber pad
(**6**)	Silencer
(**7**)	Silencer rubber pad

K9K



144609

(**A**)	Area to be cut A
(**B**)	Area to be cut B
(**1**)	Exhaust system sealing ring
(**2**)	Intermediate pipe
(**3**)	Intermediate pipe rubber pad
(**4**)	Silencer
(**5**)	Silencer rubber pad

Special tooling required	
Mot. 1199-01	Exhaust pipe cutter (diameter 35/50 mm and diameter 50/65mm). Complete kit in a case.

Equipment required
component jack

I - PARTS AND CONSUMABLES FOR THE REPAIR

1 - Parts always to be replaced:

- the exhaust sleeve (if fitted)

- the seal or sealing ring on the connection between the catalytic converter or catalytic pre-converter and the rest of the exhaust system

- the exhaust clip(s) (if fitted)

2 - Consumables (see Part number in Technical Note 5068, 04B, Consumables - Products):

- exhaust mastic

- surface cleaner

- grey abrasive pads

II - ADVICE TO OBSERVE

IMPORTANT
Do not park and run the engine in a place where combustible substances and materials such as grass or leaves can come into contact with the hot exhaust system.

IMPORTANT
Catalytic converters contain ceramic fibres, these are contained within a closed unit, and cannot disperse. Drilling or cutting catalytic converters is prohibited.

1 - During removal and refitting, the catalytic converter or catalytic pre-converter must not receive any knocks or impacts as this could damage it.

2 - The whole exhaust pipe is made of stainless steel.

3 - After working on the bracket between the catalytic converter or catalytic pre-converter and the rest of the exhaust system, ensure that the connection is perfectly sealed.

To do this:

- clean the bearing faces of the connection using **GREY ABRASIVE PADS**,

- degrease the bearing faces of the connection using **SURFACE CLEANER** and clean cloths,

- always replace the seal or sealing ring on the connection.

III - SPECIAL NOTES ON THE SINGLE UNIT EXHAUST PIPE

1 - Cutting the single unit exhaust pipe

The exhaust pipe is a « single unit type » .

To replace different parts of the exhaust system it must be cut.

To do this be sure to carry out these precautions in the following order:

- correctly identify the area to be cut, as explained below,

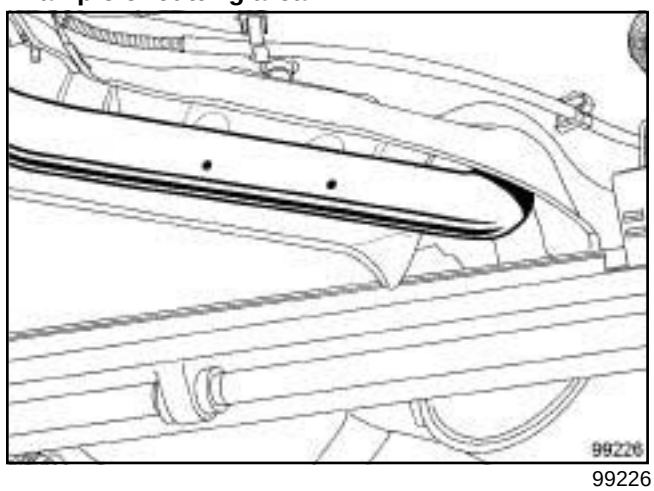
- use the cutting tool correctly **(Mot. 1199-01)**,

- position the exhaust sleeve correctly.

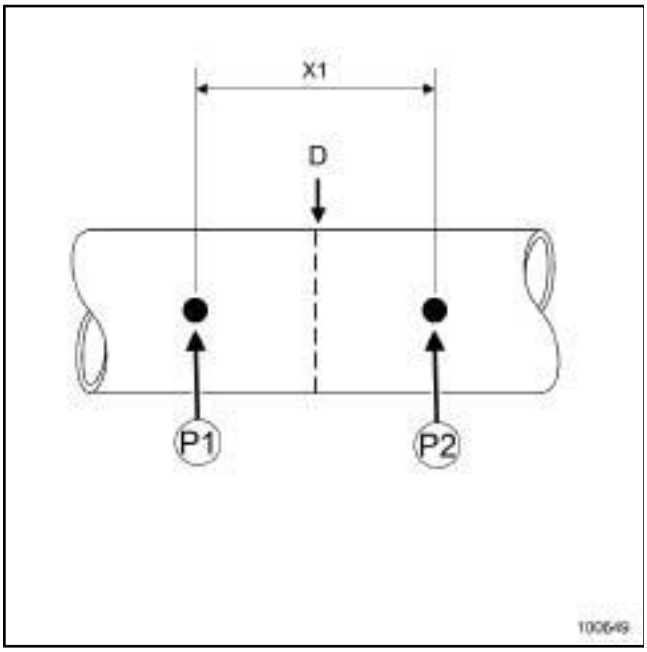
2 - Identifying the area of the exhaust system to be cut

Two marks made on the exhaust system define the area to be cut (see **Exhaust: Parts and consumables for the repair**) (see MR for vehicle concerned, 19B, Exhaust).

Example of cutting area



99226

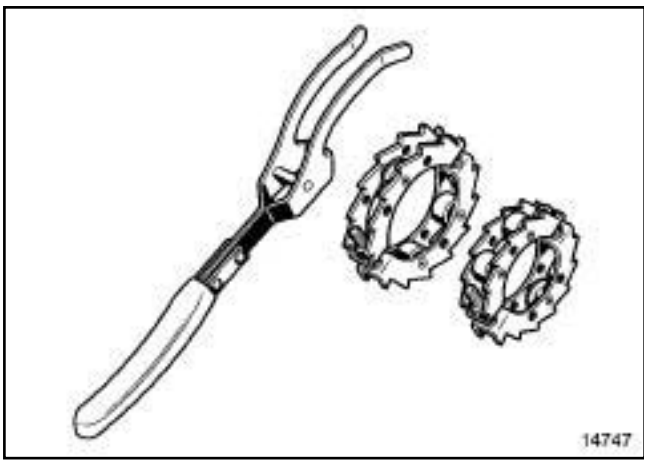


100649

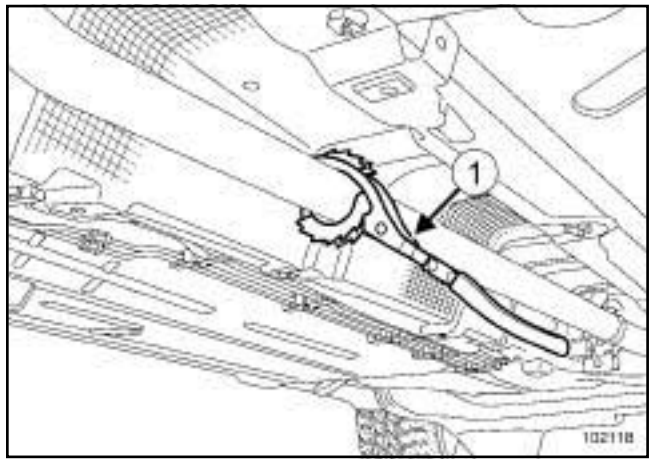
Before cutting the exhaust system, draw a line (**D**) between the two marks (**P1**) and (**P2**) .

The distance between the two marks on the exhaust pipe is (**X1**) : **80 mm**.

3 - Operate tool Mot. 1199-01



14747



102118

Fit the **(Mot. 1199-01)** (**1**) on the exhaust pipe.

Tighten the two bolts on the tool until they touch the pipe in order to clamp the tool onto the pipe.

Turn the cutting tool using the handle and pressing it against the pipe (as indicated in the diagram above).

Tighten the two bolts on the tool whilst cutting, until the pipe is completely cut.

Note:

Do not over-tighten the tool onto the pipe to avoid deforming it.

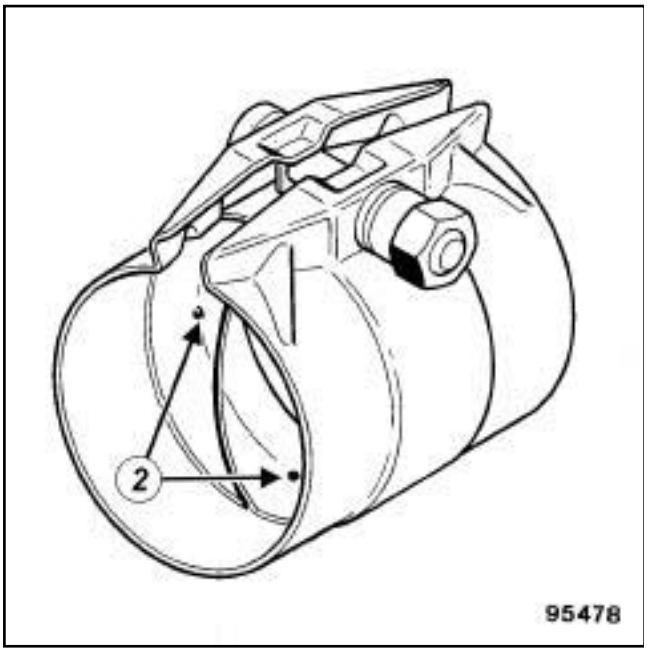
Once the pipe is cut, file and deburr the end of the pipe to be used on the vehicle again.

4 - Positioning the exhaust sleeve

WARNING

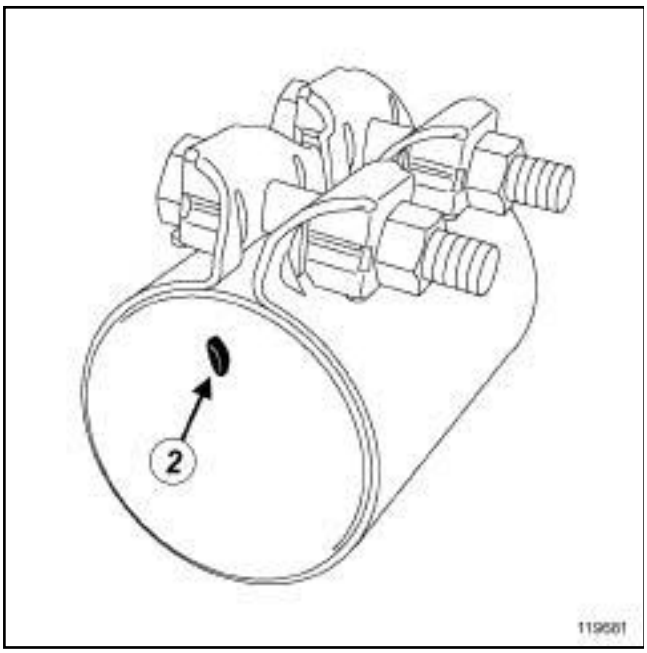
Do not reuse an old exhaust sleeve.

Exhaust sleeve with 1 bolt



95478

Exhaust sleeve with 2 bolts



119681

Fit the exhaust sleeve onto the part of the exhaust system fitted to the vehicle.

Position the pipe onto the lugs (**2**) inside the exhaust sleeve.

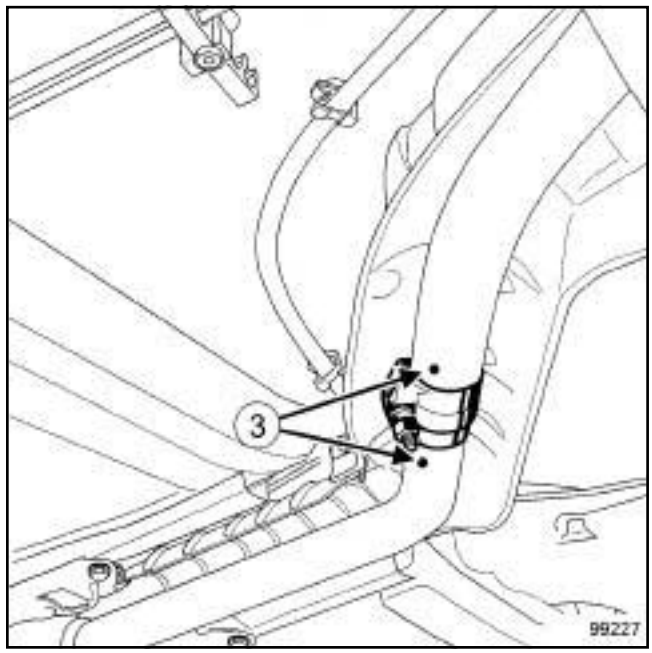
Tighten the exhaust sleeve bolt(s) slightly (depending on the version).

Position the second part of the exhaust system under the vehicle, fitting it in the exhaust sleeve.

Note:

If necessary, use a **component jack** to lift and hold the heavy and bulky components of the exhaust system.

Position the second exhaust pipe onto the lugs inside the exhaust sleeve.



99227

Check that the two cut marks (**3**) are aligned (if applicable).

Position the sleeve so that there is no risk of contact between its bolt or bolts and the heat shields.

Torque tighten:

- the **exhaust sleeve nut with 1 bolt (25 N.m)** (if fitted),
- the **exhaust sleeve nuts with 2 bolts (18 N.m)** (if fitted).

Check the following and deal with if necessary:

- no underbody contact between the exhaust system and the heat shields,
- all of the heat shields are present and secure.

Note:

Any damaged heat shields must be replaced.

Start the engine.

Check that there are no leaks: deal with any leaks.

Note:

If there are leaks from the **EXHAUST SLEEVES WITH 1 BOLT**, apply **EXHAUST MASTIC** to the sleeve (see part no. in Technical Note 5068, 04B, Consumables - Products).

If the application of exhaust mastic does not fix the leak:

- remove and replace the used exhaust sleeve,
- check the condition of the exhaust pipes (condition of the pipe surface, deburring of the area cut, damage to the pipes).
- fit the new sleeve in accordance with the instructions given before.

K9K, and 796

Tightening torques ▽	
turbocharger output studs	**9 N.m**
catalytic converter nuts on the turbocharger	**28 N.m**
upstream strut bolts on the engine	**44 N.m**
downstream strut bolt and nut on the gearbox	**21 N.m**
upstream strut bolts on the catalytic converter	**26 N.m**
downstream strut bolt on the catalytic converter	**21 N.m**
exhaust flange bolts	**21 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

IMPORTANT

Wear cut-resistant gloves during the operation.

IMPORTANT

Catalytic converters contain ceramic fibres, these are contained within a closed unit, and cannot disperse. Drilling or cutting catalytic converters is prohibited.

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

REMOVAL

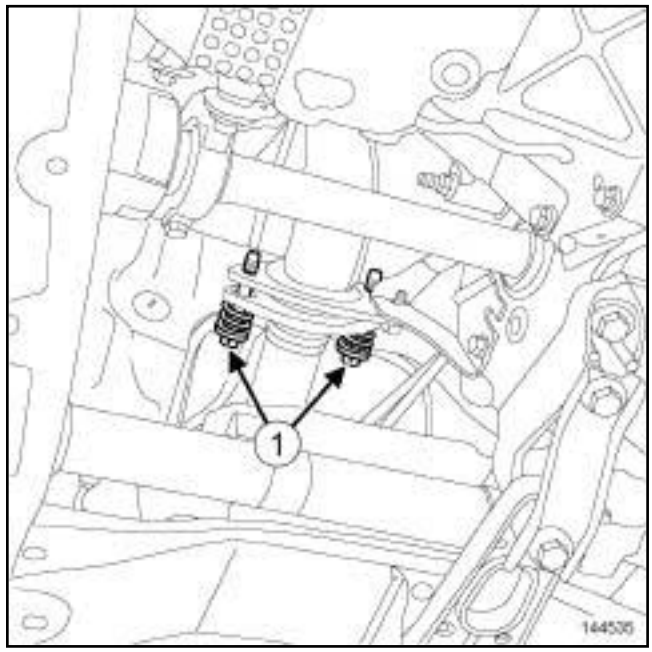
I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Remove the air filter unit (see **12A**, **Fuel mixture**, **Air filter unit: Removal - Refitting**, page **12A-6**) .

II - REMOVAL OPERATION



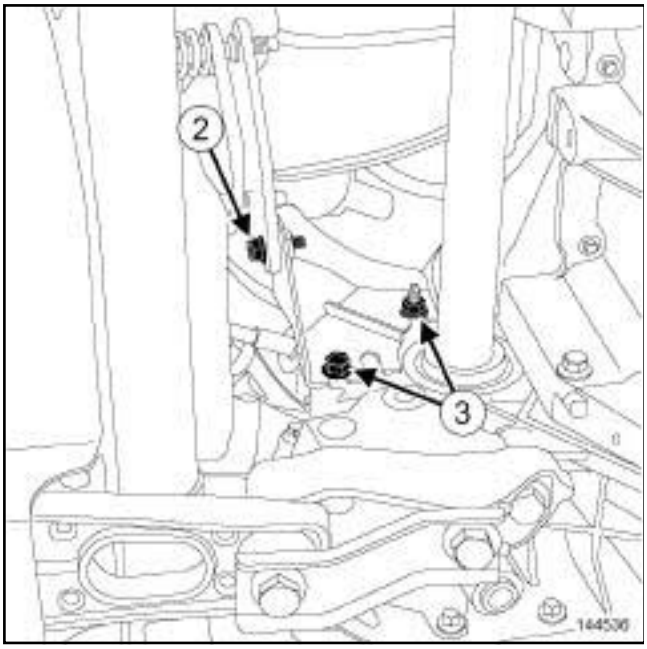
144535

❑ Remove the exhaust flange bolts (**1**) .

❑ Withdraw the exhaust pipe.

❑ Attach the exhaust pipe to the front left-hand lower arm.

K9K, and 796

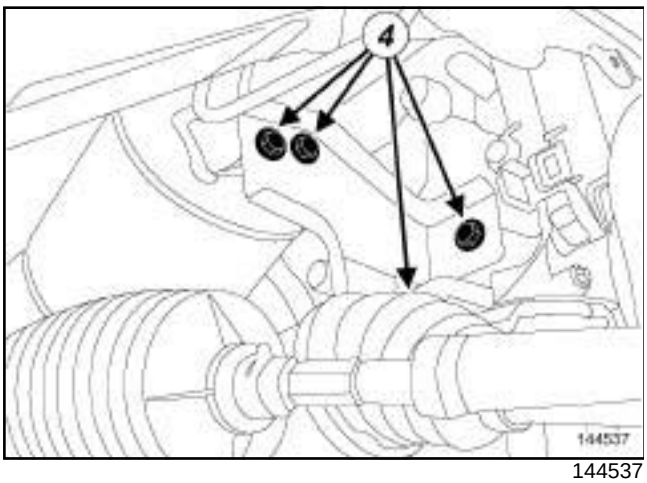


144536

❏ Remove the bolt from the downstream strut on the catalytic converter (**2**) .

❏ Loosen the downstream strut bolt and nut on the gearbox (**3**) .

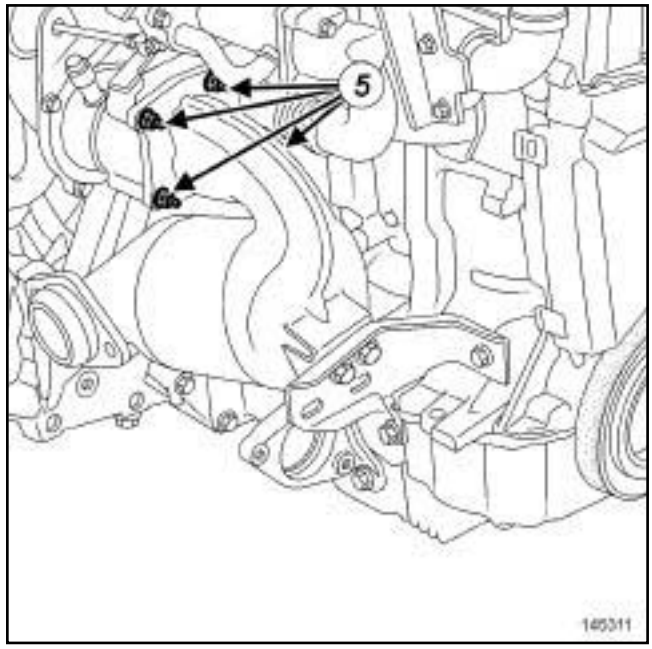
❏ Remove the downstream strut.



144537

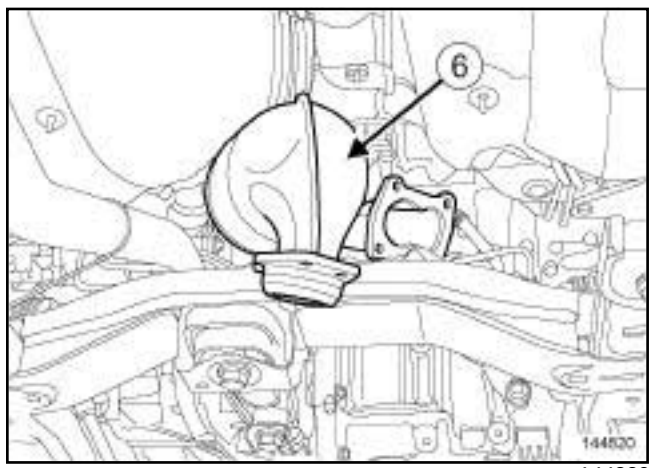
❏ Remove:

- the bolts of the upstream strut (**4**) ,
- the upstream strut.



145311

❏ Remove the catalytic converter nuts on the turbocharger (**5**) .



144820

❏ Remove:

- the catalytic converter (**6**) ,
- the seal between the turbocharger and the catalytic converter,
- the exhaust flange sealing ring.

K9K, and 796

REFITTING

I - REFITTING PREPARATION OPERATION

❑

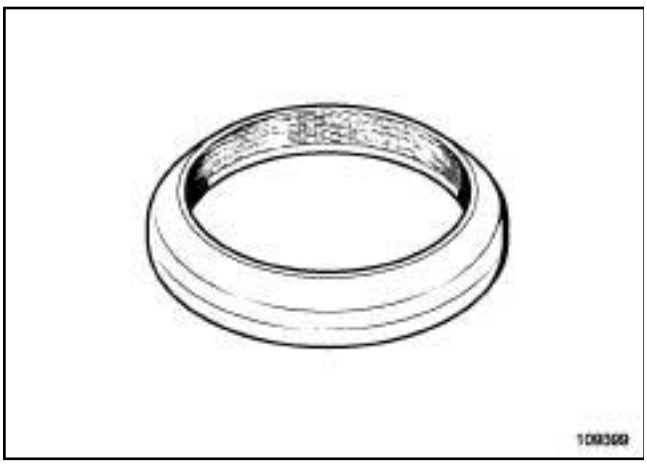
WARNING
To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Use **ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to clean the joint face of:

- the intermediate pipe,
- the catalytic converter in case of reuse,
- the turbocharger.

❑ Use **SURFACE CLEANER** and **CLEAN CLOTHS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products) to degrease the joint face of:

- the intermediate pipe,
- the catalytic converter in case of reuse,
- the turbocharger.



109399

❑ Always replace the exhaust flange sealing ring.

❑ **parts always to be replaced: seal between turbocharger and catalytic converter**

II - REFITTING OPERATION

❑

Note:
If a stud loosens during this operation, coat it with **HIGH STRENGTH THREAD LOCK** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).
Torque tighten the **turbocharger output studs (9 N.m)**.

❑ Fit:

- a new seal between the turbocharger and the catalytic converter,
- the catalytic converter on the turbocharger.

❑ Pretighten in order:

- the bolt and nut of the upstream strut on the engine,
- the downstream strut bolt and nut on the gearbox,
- the upstream strut bolts on the catalytic converter,
- the downstream strut bolt on the catalytic converter,
- the catalytic converter nuts on the turbocharger.

❑ Torque tighten in order:

- the **catalytic converter nuts on the turbocharger (28 N.m)**,
- the **upstream strut bolts on the engine (44 N.m)**,
- the **downstream strut bolt and nut on the gearbox (21 N.m)**,
- the **upstream strut bolts on the catalytic converter (26 N.m)**,
- the **downstream strut bolt on the catalytic converter (21 N.m)**.

❑ Make sure there is no contact between the catalytic converter and the turbocharger oil return pipe.

❑ Proceed in the reverse order to removal.

❑ Torque tighten the **exhaust flange bolts (21 N.m)**.

III - FINAL OPERATION

❑ Check:

- that all the exhaust pipe heat shields are in place and properly attached,
- that there is no contact with the underbody.

❑ Start the vehicle.

K9K, and 796

❑ Check that there are no leaks and deal with them if necessary.

K4M, and 4X2 TRANSMISSION

Special tooling required	
Mot. 1199-01	Exhaust pipe cutter (diameter 35/50 mm and diameter 50/65mm). Complete kit in a case.

Equipment required
component jack

Tightening torques ▽	
bolt of the exhaust flange	**21 N.m**
oxygen sensor	**45 N.m**

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

IMPORTANT
Wear cut-resistant gloves during the operation.

IMPORTANT
Catalytic converters contain ceramic fibres, these are contained within a closed unit, and cannot disperse. Drilling or cutting catalytic converters is prohibited.

WARNING
To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

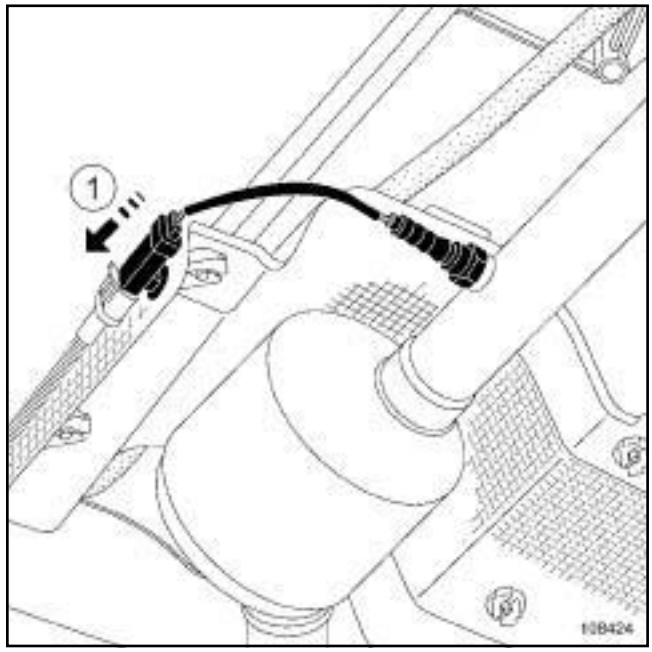
REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

II - REMOVAL OPERATION



108424

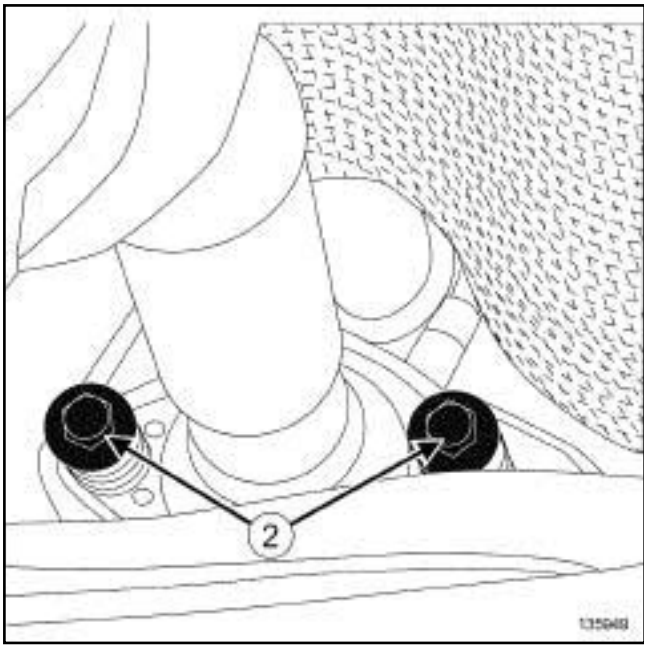
❑ Remove the downstream oxygen sensor connector from its mounting by sliding it (**1**) .

❑ Disconnect the downstream oxygen sensor connector.

❑ Put a **component jack** under the catalytic converter.

❑ Locate the area of the catalytic converter to be cut (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

❑ Use the tool **(Mot. 1199-01)** to cut the exhaust pipe in the area to be cut (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .



135949

❑ Remove:

- the exhaust flange bolts (**2**) ,
- the catalytic converter,
- the exhaust flange ring.

IF REPLACING THE CATALYTIC CONVERTER

❑ Remove the downstream oxygen sensor on the catalytic converter (see) .

REFITTING

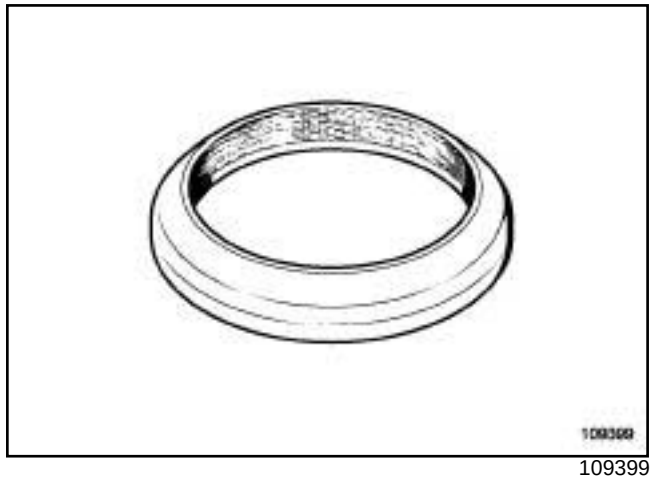
I - REFITTING PREPARATION OPERATION

❑

> **WARNING**
> To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

❑ Clean the bearing faces of the catalytic converter using **ABRASIVE PADS** (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).

❑ Degrease the bearing faces of the catalytic converter using **SURFACE CLEANER** and clean cloths (see **Vehicle: Parts and consumables for the repair**) (04B, Consumables - Products).


109399

❑ **parts always to be replaced: ring between exhaust manifold and catalytic converter**

II - REFITTING OPERATION

❑ Refit:

- the downstream oxygen sensor (if replacing the catalytic converter),
- the catalytic converter.

❑ Fit a new After-Sales sleeve between the catalytic converter and the expansion chamber (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

> **IMPORTANT**
> Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

❑ Tighten the sleeve bolt while guiding the exhaust pipe to ensure correct alignment.

❑ Torque tighten:

- the **bolt of the exhaust flange (21 N.m)**,
- the **oxygen sensor (45 N.m)**.

III - FINAL OPERATION

❑ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Check:

- that all the exhaust pipe heat shields are in place and properly attached,
- that there is no contact with the underbody.

❑ Start the vehicle.

K4M, and 4X2 TRANSMISSION

❑ Check that there are no leaks and deal with them if necessary.

K4M, and 4X2 TRANSMISSION

Special tooling required	
Mot. 1199-01	Exhaust pipe cutter (diameter 35/50 mm and diameter 50/65mm). Complete kit in a case.
Mot. 1857	Pliers for removing exhaust pipe rubber mounting bushes

Equipment required
component jack

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

WARNING
To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❑ Place a **component jack** under the expansion chamber.

II - REMOVAL OPERATION

❑ Locate the areas of the expansion chamber to be cut (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

❑ Cut the exhaust pipe using the tool **(Mot. 1199-01)** in the designated areas to be cut (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

❑ Remove the rubber pad from the expansion chamber using the tool **(Mot. 1857)**.

Note:
If the rubber pad is damaged, replace the rubber pad.

❑ Remove the expansion chamber.

REFITTING

I - REFITTING OPERATION

❑ Refit:

- the expansion chamber,
- the expansion chamber rubber pad.

❑ Fit new after-sales sleeves (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

IMPORTANT
Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

❑ Torque tighten the sleeve bolts while supporting the exhaust pipe to ensure alignment.

II - FINAL OPERATION

❑ Check:

- all the exhaust pipe heat shields are in place and properly attached.
- that there is no contact with the underbody,

❑ Start the vehicle.

❑ Check that there are no leaks and deal with them if necessary.

K9K

Special tooling required	
Mot. 1199-01	Exhaust pipe cutter (diameter 35/50 mm and diameter 50/65mm). Complete kit in a case.
Mot. 1857	Pliers for removing exhaust pipe rubber mounting bushes

Equipment required
component jack

Tightening torques ▽	
exhaust sleeve bolts	**25 N.m**

IMPORTANT

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**)

WARNING

To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

IMPORTANT

Wear heat protective gloves during the operation.

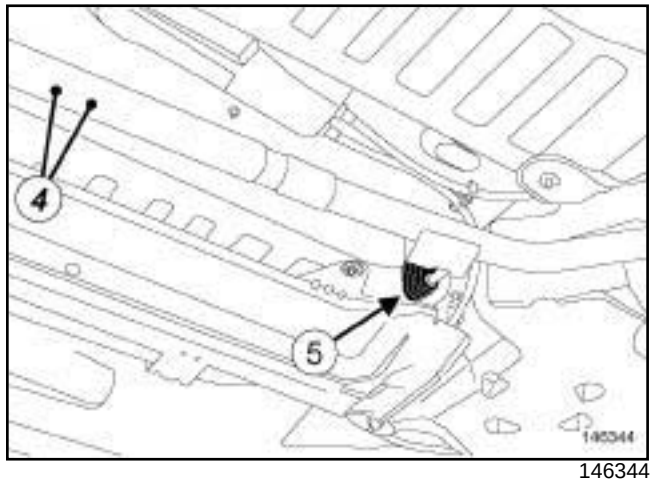
REMOVAL

I - REMOVAL PREPARATION OPERATION

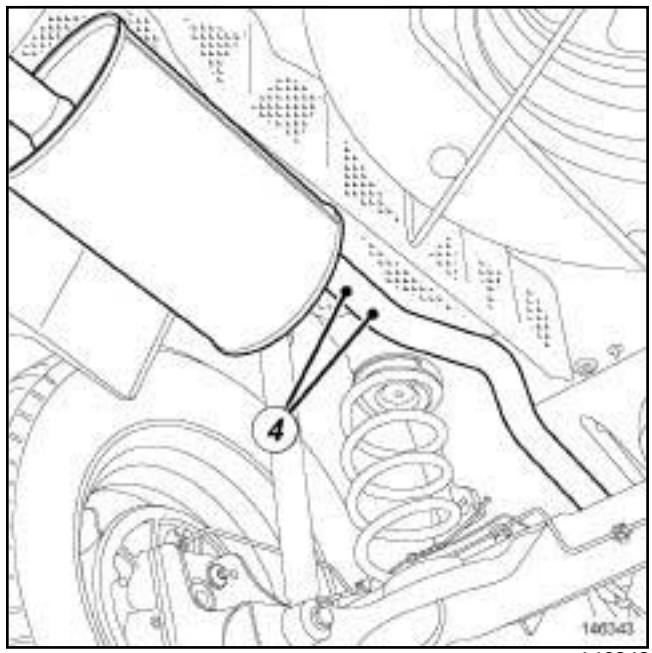
❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Fit a **component jack** under the intermediate pipe.

II - REMOVAL OPERATION



146344



146343

❏ Cut the exhaust pipe using the tool **(Mot. 1199-01)** in the centre of the areas to be cut (**4**) (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

❏ Remove the rubber mounting bush (**5**) from the intermediate pipe using the tool **(Mot. 1857)**.

Note:

If the rubber mounting bush is damaged, it must always be replaced.

❏ Remove the intermediate pipe.

K9K

REFITTING

I - REFITTING OPERATION

❑ Refit the intermediate pipe.

❑ Refit the exhaust sleeves (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

WARNING
Make sure:

- that the sleeve nut-bolt tightening assembly is vertical, with the nut facing downwards, to prevent any risk of underbody contact,
- that you position the new component in a way that the cutting area marks are aligned,
- that the two marks are flush with the two ends of the sleeve,
- that an old sleeve is not reused.

❑ Torque tighten the **exhaust sleeve bolts (25 N.m)**.

❑ Refit the rubber mounting bush of the intermediate pipe.

II - FINAL OPERATION

❑ Check:

- that all the exhaust pipe heat shields are in place and properly attached,
- that there is no contact with the underbody.

4X2 TRANSMISSION

Special tooling required	
Mot. 1199-01	Exhaust pipe cutter (diameter 35/50 mm and diameter 50/65mm). Complete kit in a case.
Mot. 1857	Pliers for removing exhaust pipe rubber mounting bushes

Equipment required
component jack

IMPORTANT
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

WARNING
To prevent the surrounding components from overheating, do not damage (tear, pierce, bend, etc.) a heat shield.

Any damaged heat shields must be replaced.

IMPORTANT
Wear heat protective gloves during the operation.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Place a **component jack** under the silencer.

II - REMOVAL OPERATION

❏ Locate the area of the silencer to be cut (see **19B**, **Exhaust**, **Exhaust: List and location of components**, page **19B-1**) .

❏ Use the tool **(Mot. 1199-01)** to cut the exhaust pipe in the area to be cut (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

❏ Remove the rubber pad from the silencer using the tool **(Mot. 1857)**.

Note:
If the rubber pad is damaged, replace the rubber pad.

❏ Remove the silencer.

REFITTING

I - REFITTING OPERATION

❏ Refit:

- the silencer,
- the silencer rubber pad.

❏ Fit a new After-Sales exhaust sleeve (see **19B**, **Exhaust**, **Exhaust: Precautions for the repair**, page **19B-6**) .

IMPORTANT
Position the « nut and bolt securing the sleeve » assembly so that the assembly cannot come into contact with the underbody.

❏ Tighten the sleeve while relieving the exhaust to ensure alignment.

II - FINAL OPERATION

❏ Check:

- that all the exhaust pipe heat shields are in place and properly attached,
- that there is no contact with the underbody.

❏ Start the vehicle.

❏ Check that there are no leaks and deal with them if necessary.

Special tooling required	
Mot. 1311-08	Union for taking fuel pressure measurements.

Equipment required
pneumatic transfer pump for fuels

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

IMPORTANT

Wear goggles with side protectors for this operation.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

DRAINING

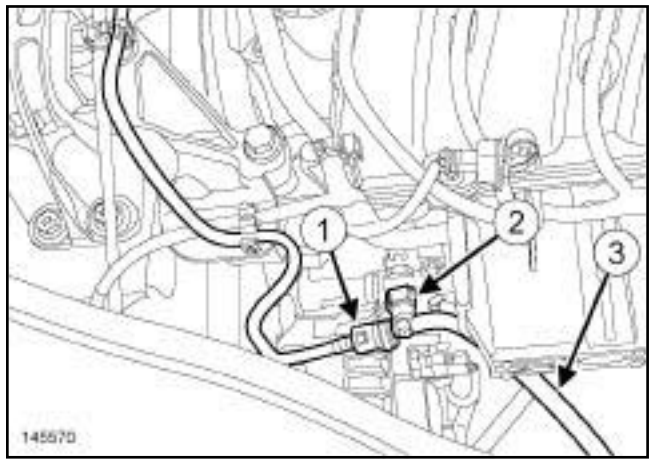
I - DRAINING PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

II - DRAINING OPERATION

K4M

❑ Disconnect the fuel supply union from the injector rail ***(1)*** .



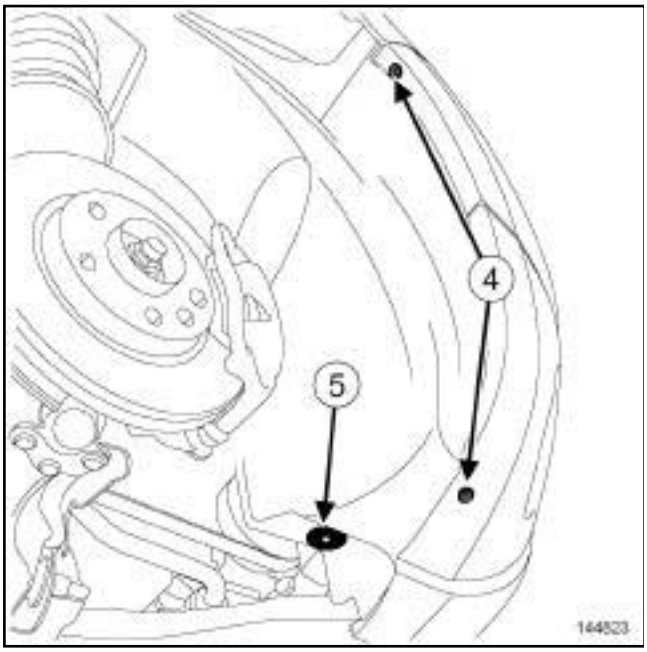
145570

❑ Fit a T-union **(Mot. 1311-08)** at (**2**) .

❑ Connect a **pneumatic transfer pump for fuels** to the T-union outlet (**3**) .

K9K

❑ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

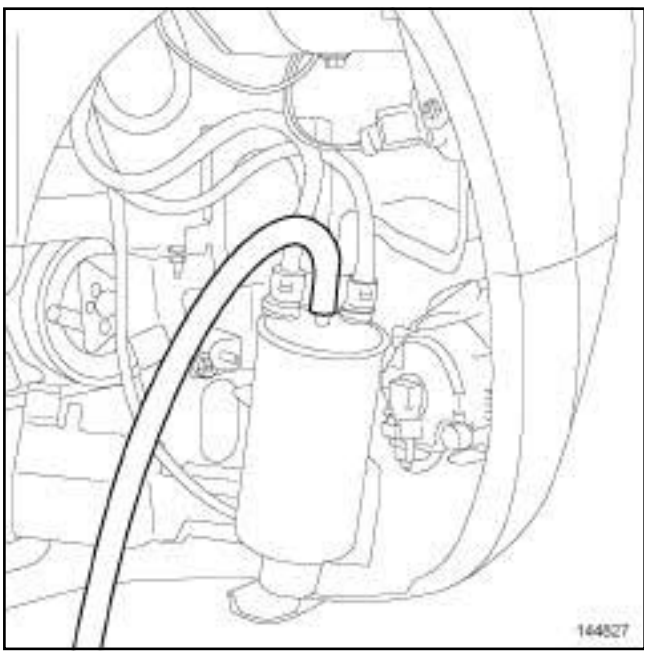


144823

❏ Remove:

- the front right-hand wheel arch liner bolts (**4**) ,
- the clip of the wheel arch liner (**5**) ,
- the diesel filter protector (see) .

❏ Disconnect the fuel outlet pipe from the fuel filter.



144827

❏ Connect a **pneumatic transfer pump for fuels** to the fuel filter.

❏ Prepare for fuel outflow.

❏ Drain the fuel tank.

REFITTING

❏ Proceed in the reverse order to removal.

Tightening torques ▽	
fuel tank bolts	**21 N.m**
exhaust pipe bolts on the catalytic converter	**21 N.m**
catalytic converter bolts on the exhaust manifold	**21 N.m**
earth cable nut on the body	**8 N.m**

This method describes the removal - refitting procedure for the plastic tank

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

WARNING

To prevent impurities from entering the circuit, place protective plugs on all fuel circuit components exposed to the open air.

REMOVAL

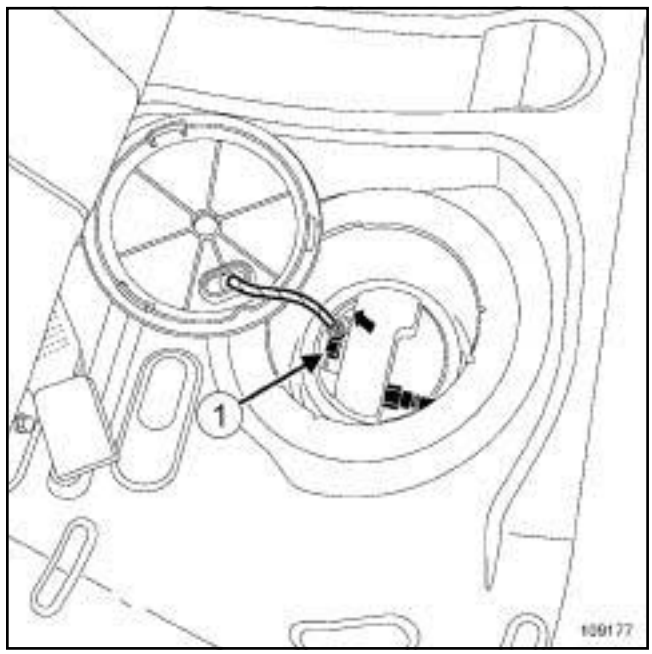
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❏ Drain the tank (see **19C**, **Tank**, **Fuel tank: Draining**, page **19C-1**) .

❏ Tilt the rear bench seat base (see) (76A, Rear seat frames and runners).

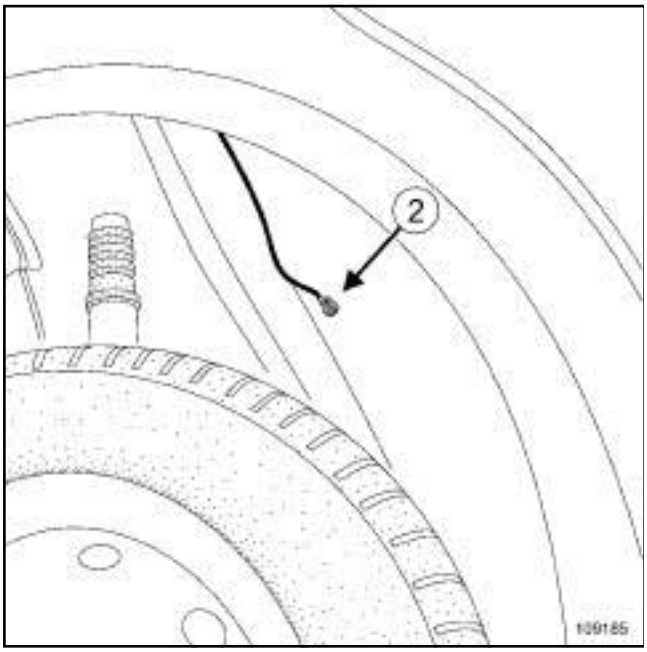


109177

❏ Remove the access flap to the fuel level sensor module on the floor.

❏ Disconnect the connector (**1**) from the fuel pump.

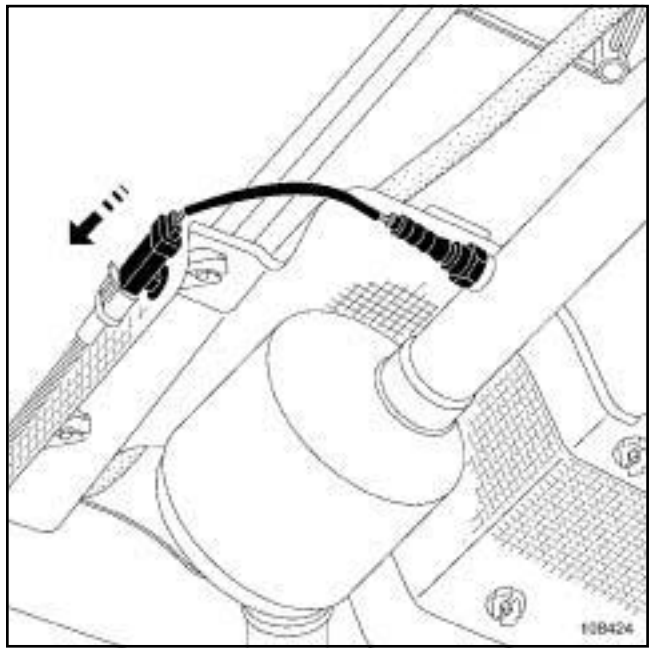
K4M



109185

❏ Remove the body earth cable at (**2**) .

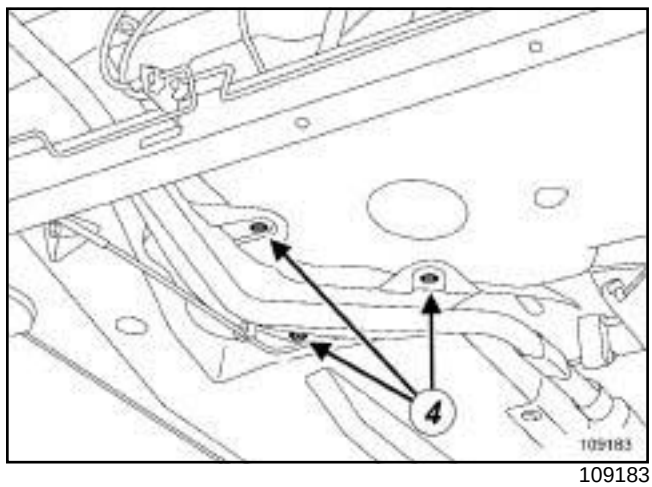
K4M



108424

❏ Remove the oxygen sensor connector by sliding it from its support (in the direction of the arrow).

❏ Disconnect the oxygen sensor connector.

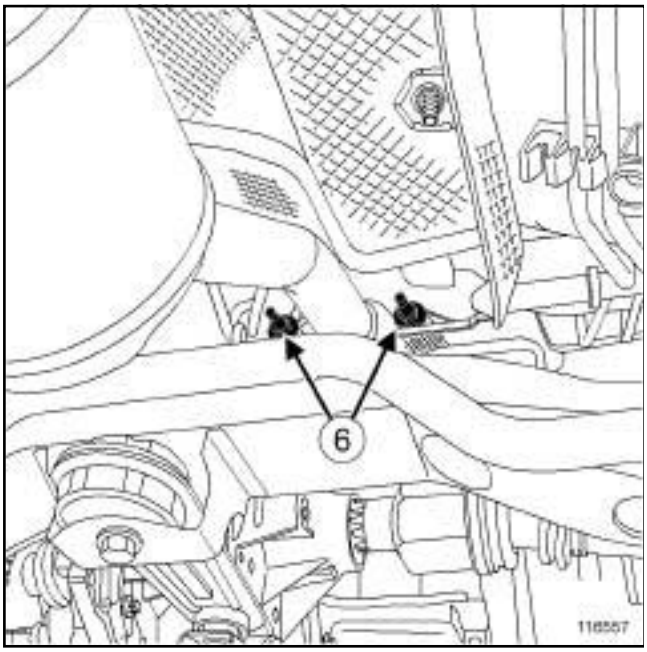


109183

❏ Remove:

- the heat shield pins (**4**) ,
- the fuel tank heat shield.

K4M



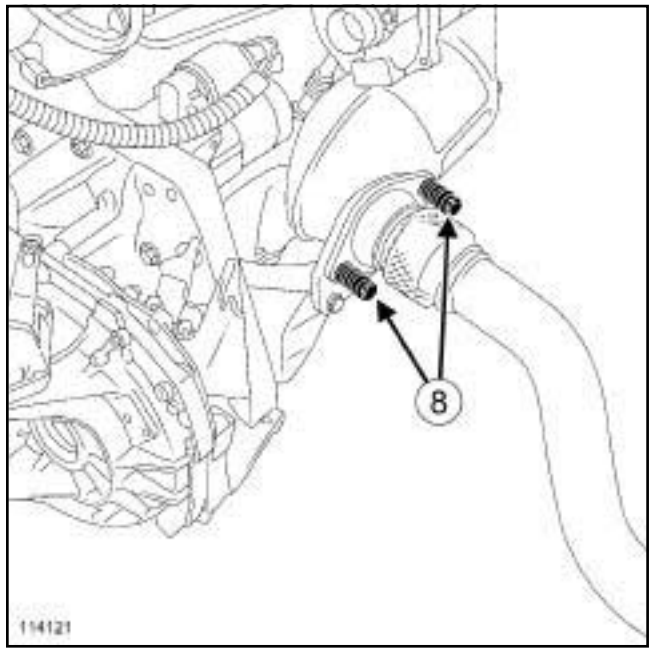
116557

❏ Remove the catalytic converter mountings (**6**) on the exhaust manifold.

❏ Detach the exhaust line assembly on the left-hand side.

❏ Attach the front section of the exhaust line assembly to the front lower arm on the left-hand side.

K9K



114121

❏ Remove the exhaust pipe mountings (**8**) from the catalytic converter.

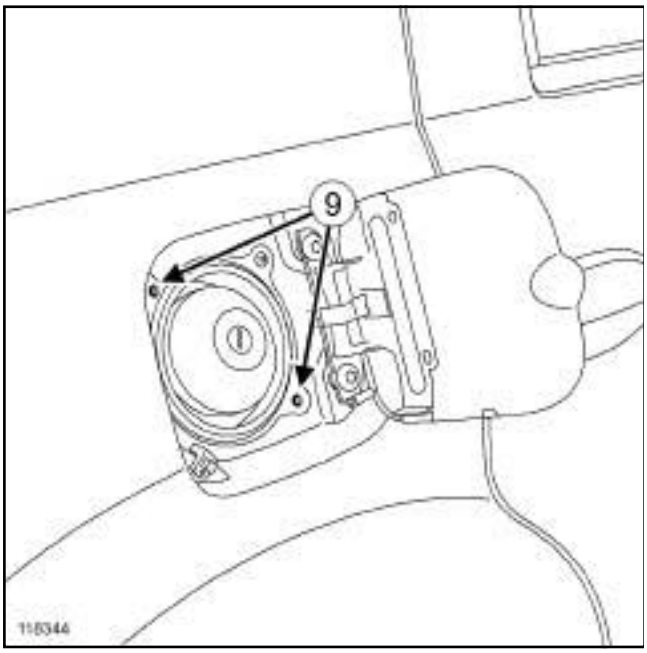
❏ Place the exhaust line assembly on the left-hand side.

❏ Attach the front section of the exhaust line assembly to the front lower arm on the left-hand side.

❏ Unclip the parking brake cables from:

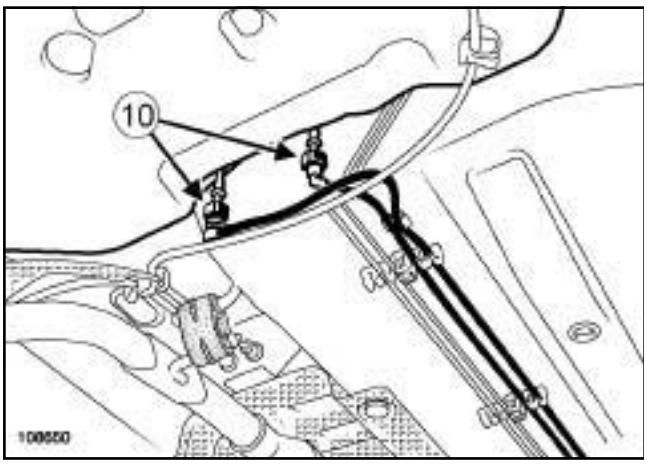
- the fuel tank,
- on the body.

II - OPERATION FOR REMOVAL OF PART CONCERNED



118344

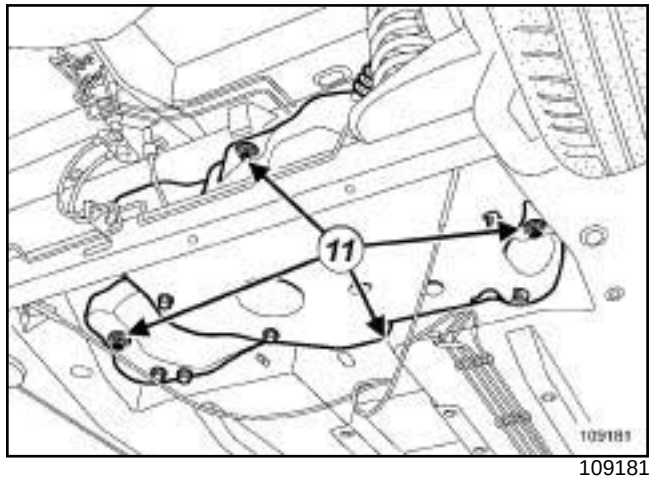
❏ Remove the bolts (**9**) from the filler neck.



108650

❏ Disconnect the snap-on unions (**10**) from the tank outlet pipes.

❏ Remove the external fuel filter (if fitted to the vehicle) (see **Fuel filter: Removal - Refitting**) .



109181

❏

Note:
This operation requires two people.

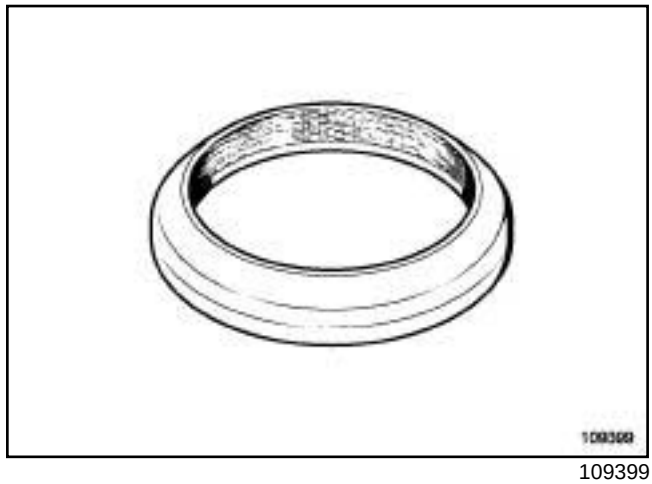
❏ Remove the bolts (**11**) from the fuel tank.

❏ Lower the tank slightly.

❏ Remove the fuel tank.

REFITTING

I - REFITTING PREPARATION OPERATION



109399

❏ It is essential to replace the sealing ring between the exhaust manifold and the catalytic converter.

II - REFITTING OPERATION FOR PART CONCERNED

❏

Note:
This operation requires two people.

4X2 TRANSMISSION

- ❏ Refit the fuel tank.
- ❏ Refit the fuel tank bolts.
- ❏ Torque tighten the **fuel tank bolts (21 N.m)**.
- ❏ Refit the external fuel filter (if fitted to the vehicle) (see **Fuel filter: Removal - Refitting**) .
- ❏ Reconnect the snap-on unions to the tank outlet fuel pipes.
- ❏ Refit the filler neck bolts.

III - FINAL OPERATION

- ❏ Clip the parking brake cables:
  - onto the body,
  - onto the fuel tank.

K9K

- ❏ Refit the exhaust system assembly onto the catalytic converter.
- ❏ Torque tighten the **exhaust pipe bolts on the catalytic converter (21 N.m)**.

K4M

- ❏ Refit the exhaust system assembly onto the exhaust manifold.
- ❏ Torque tighten the **catalytic converter bolts on the exhaust manifold (21 N.m)**.
- ❏ Connect the oxygen sensor connector.
- ❏ Refit:
  - the oxygen sensor connector to its support,
  - the earth cable on the body.
- ❏ Torque tighten the **earth cable nut on the body (8 N.m)**.

- ❏ Refit:
  - the fuel tank heat shield,
  - the heat shield pins.
- ❏ Reconnect the fuel level sensor module connector.
- ❏ Refit the access flap for the fuel level sensor module on the floor.
- ❏ Refit the rear bench seat base (see) (76A, Rear seat frames and runners).
- ❏ Connect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

Fuel level sensor module: Removal - Refitting

K4M or K9K

Special tooling required	
Car. 1363	Set of trim removal levers.
Mot. 1397	Universal spanner for removing fuel gauge nuts.

IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

IMPORTANT

Wear goggles with side protectors for this operation.

IMPORTANT

Wear leaktight gloves (Nitrile type) for this operation.

WARNING

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

REMOVAL

I - REMOVAL PREPARATION OPERATION

❑ Disconnect the battery (see **Battery: Removal - Refitting**) (80A, Battery).

❑ Tilt the rear bench seat base.

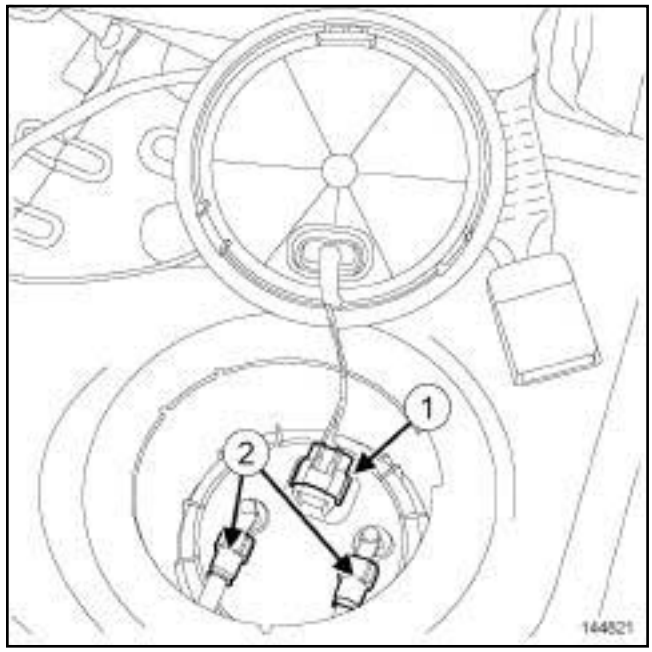
II - REMOVAL OPERATION

❑ Remove the blanking cover from the inspection flap using the tool **(Car. 1363)**.

Note:

Make provisions for the flow of fuel from the fuel supply and return pipes.

K9K



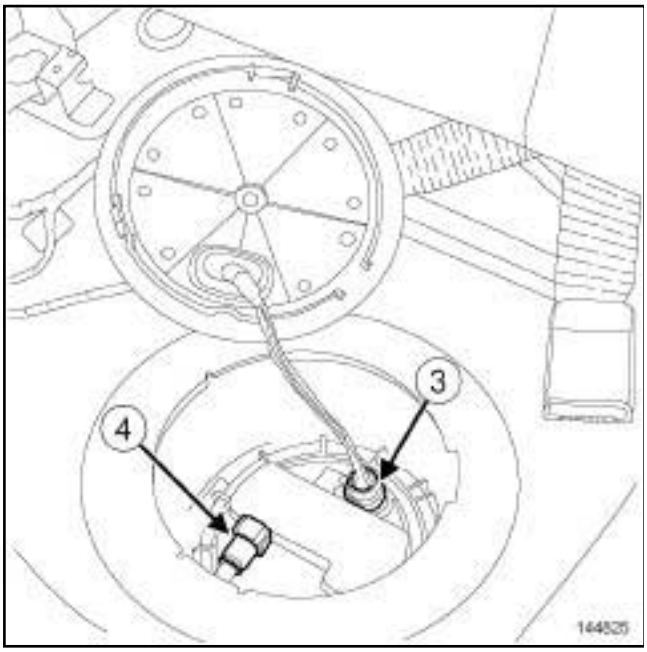
144821

❑ Disconnect:

- the connector (**1**) ,
- the unions (**2**) .

K4M or K9K

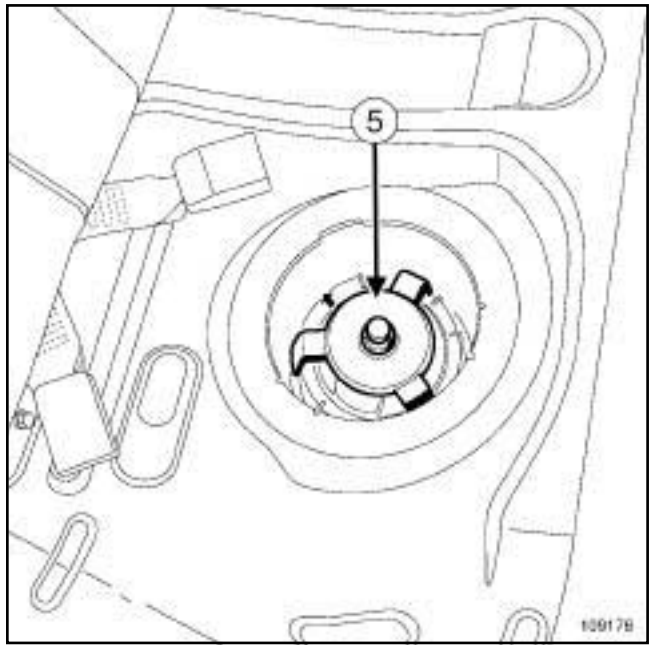
K4M



144825

❑ Disconnect:

- the connector (**3**) ,
- union (**4**) .



109176

❑ Remove the nut from the fuel level sensor module using the tool **(Mot. 1397)** (**5**) ,

❑ Let the fuel drain from the fuel level sensor module.

❑ Remove:

- the fuel level sensor module, taking care not to damage the float,
- the fuel level sensor module seal.

WARNING
To prevent the tank from deforming, refit the fuel sender unit nut to the tank well immediately.

REFITTING

I - REFITTING PREPARATION OPERATION

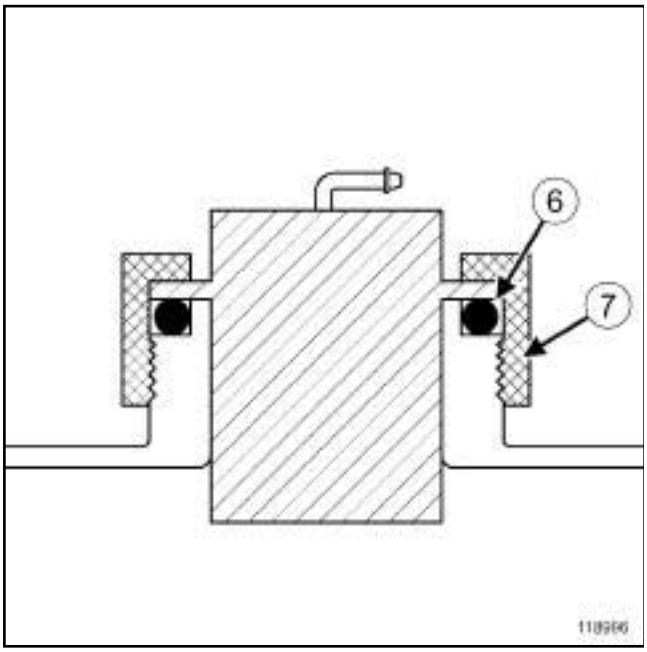
❑ **parts always to be replaced: Fuel level sensor module nut**

❑ **parts always to be replaced: Fuel level sensor module seal**

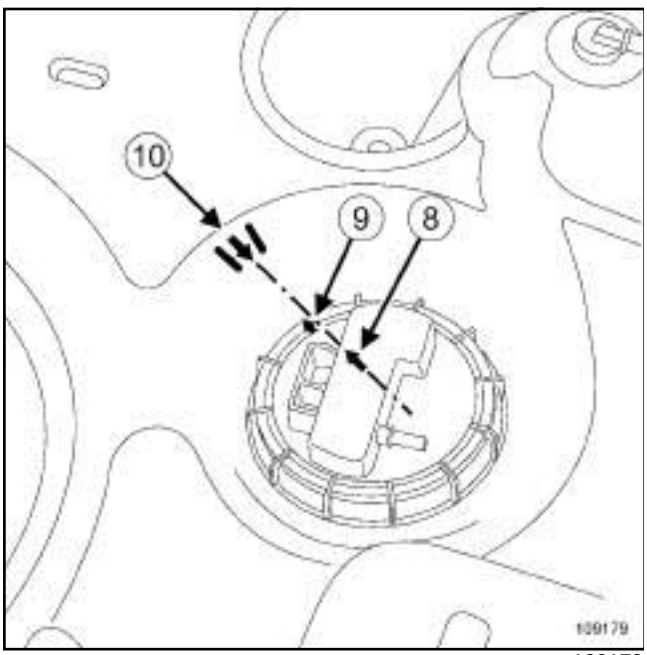
K4M or K9K

II - REFITTING OPERATION

K4M



118996



109179

❑ Position:

- the new seal (**6**) in the neck correctly,
- the fuel level sensor module on the fuel tank. A lug on the fuel level sensor module and a recess in the fuel tank ensure correct positioning in the fuel tank; the mark (**8**) on the fuel level sensor module must be positioned opposite the mark on the fuel tank (**10**) .

❑ Press the fuel level sensor module by hand (to prevent the seal from moving) and finger tighten the nut on the fuel tank.

❑ Then use the tool **(Mot. 1397)** to tighten the nut of the fuel level sensor module to the mark on the fuel tank.

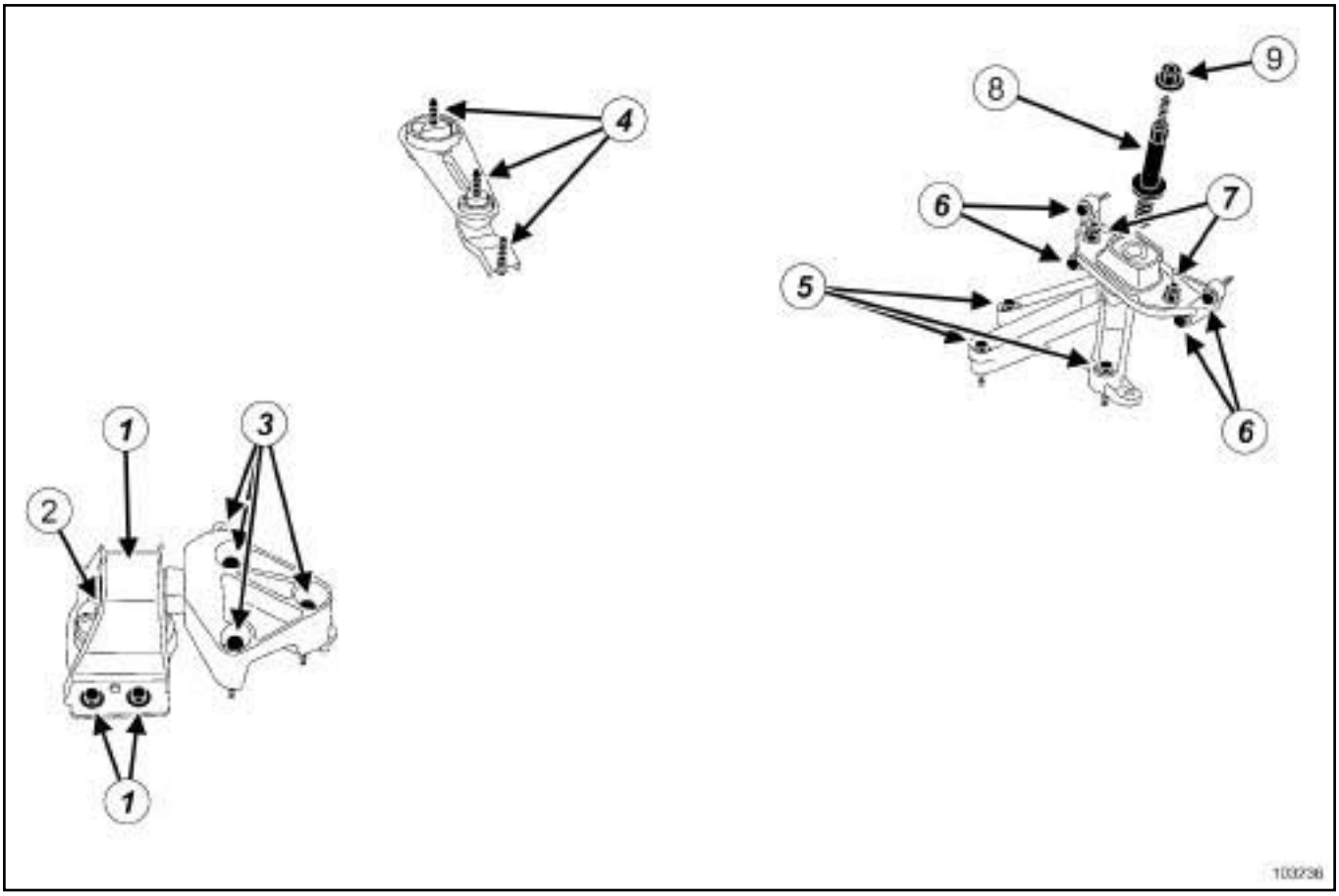
K4M

❑ Tighten the nut ***(7)*** until the mark ***(9)*** on the nut is located opposite the mark ***(10)*** on the fuel tank using the tool **(Mot. 1397)**.

❑ Proceed in the reverse order to removal.

Suspended engine mounting: Tightening torque

K9K



103236

No.	Description	Tightening torque (N.m)
(**1**)	Right-hand suspended mounting support bolt on the body	**62**
(**3**)	Right-hand suspended mounting support bolt on the engine	**62**
(**5**)	Left-hand mounting bolt on the gearbox	**62**
(**6**)	Left-hand rubber pad mounting bolt on the body	**21**
(**7**)	Left-hand rubber pad bolt on the mounting	**105**
(**8**)	Stud on the gearbox mounting	**180**
(**9**)	Gearbox mounting nut on the rubber pad	**62**

No.	Description	Tightening torque (N.m)
(4)	Engine tie-bar bolt	**180**

Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.

Tightening torques ▽	
bolts mounting the left-hand suspended mounting on the gearbox	**62 N.m**
bolt of the power-assisted steering pipe on the left-hand suspended mounting	**21 N.m**
stud on the gearbox support	**180 N.m**
left-hand rubber pad mounting bolts on the body	**21 N.m**
rubber pad nuts on the left-hand suspended mounting	**105 N.m**
nut of the gearbox support on the rubber pad	**62 N.m**

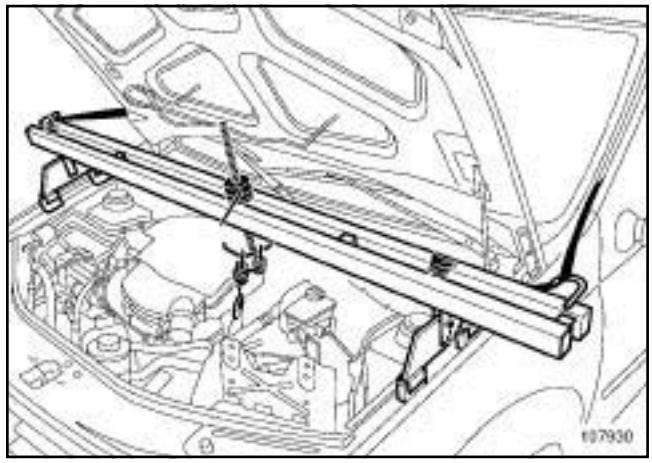
REMOVAL

I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove:

- the air inlet sleeve,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the battery tray,
- the injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-7**) ,
- the engine undertray.

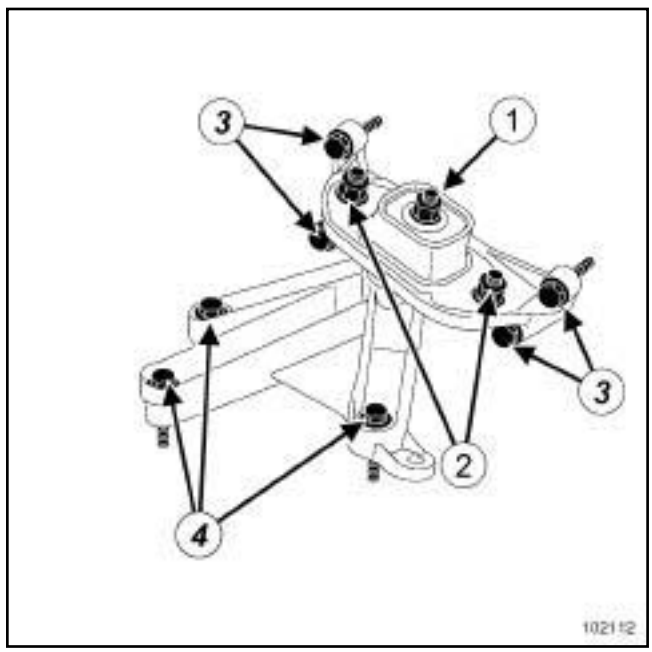


107930

❏ Fit the engine support tool **(Mot. 1453)** with the retaining belt, taking the flywheel end lifting eye as an anchoring point.

❏ Mark the position of the left-hand suspended engine mounting on the body.

II - REMOVAL OPERATION



102112

❏ Remove the nut (**1**) from the gearbox support on the rubber pad.

❏ Strike the gearbox stud with a copper hammer to separate the engine and gearbox assembly from the body.

❏ Remove:

- the nuts (**2**) from the rubber pad,
- the rubber pad,

- the bolts (**3**) from the left-hand rubber pad mounting on the body,
- the left-hand rubber pad mounting,
- the power-assisted steering pipe bolt on the suspended mounting (if fitted to the vehicle),
- the left-hand suspended mounting bolts (**4**) on the gearbox,
- the left-hand suspended mounting on the gearbox.

REFITTING

I - REFITTING PREPARATION OPERATION

❏ Always replace the self-locking nuts.

II - REFITTING OPERATION

❏ Refit:

- the left-hand suspended mounting on the gearbox,
- the power-assisted steering pipe bolt on the suspended mounting (if fitted to the vehicle),
- the left-hand rubber pad mounting,
- the rubber pad,
- the rubber pad nuts on the left-hand suspended mounting,
- the gearbox support nut on the rubber pad.

❏ Torque tighten:

- the **bolts mounting the left-hand suspended mounting on the gearbox (62 N.m)**,
- the **bolt of the power-assisted steering pipe on the left-hand suspended mounting (21 N.m)**,
- the **stud on the gearbox support (180 N.m)**,
- the **left-hand rubber pad mounting bolts on the body (21 N.m)**,
- the **rubber pad nuts on the left-hand suspended mounting (105 N.m)**,
- the **nut of the gearbox support on the rubber pad (62 N.m)**.

III - FINAL OPERATION

❏ Remove the engine support tool **(Mot. 1453)**.

❏ Refit:

- the engine undertray,
- the injection computer (see **17B**, **Petrol injection**, **Petrol injection computer: Removal - Refitting**, page **17B-7**) ,
- the battery tray,
- the battery (see **Battery: Removal - Refitting**) (80A, Battery),
- the air intake sleeve.

K9K

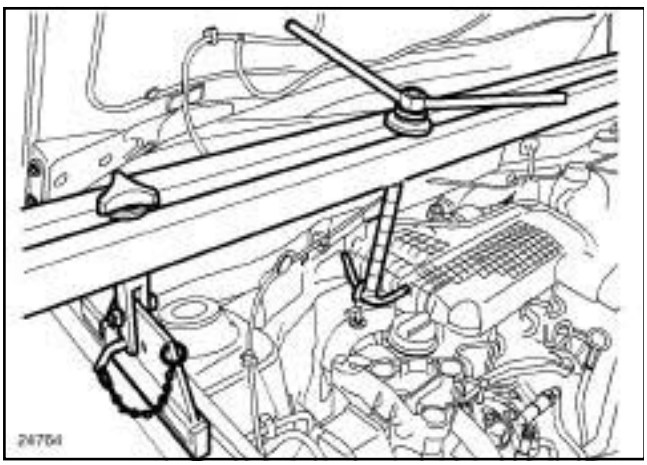
Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.

Tightening torques ▽	
right-hand suspended engine mounting bolts on the engine	**62 N.m**
right-hand suspended engine mounting bolts on the body	**62 N.m**

REMOVAL

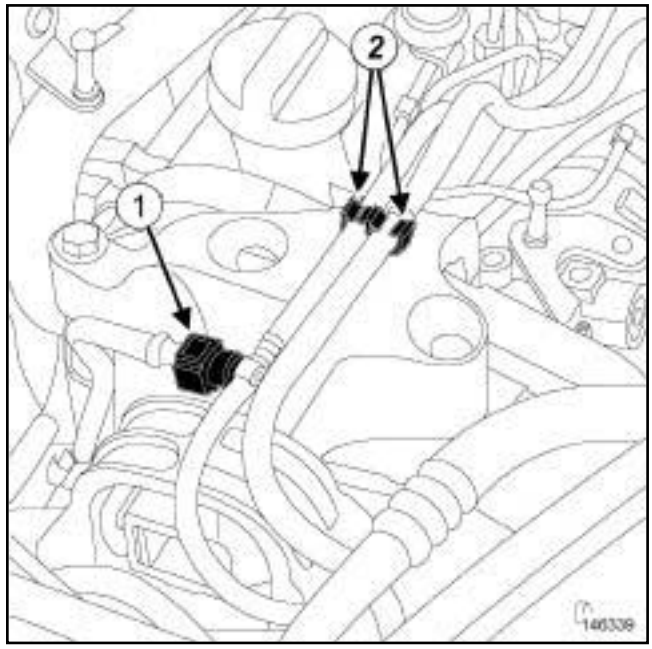
I - REMOVAL PREPARATION OPERATION

❏ Remove the front engine cover.



24764

❏ Fit the engine support tool **(Mot. 1453)** with the retaining belt, taking the timing end lifting eye as an anchoring point.



146339

❏ Disconnect the fuel pipe at (**1**) ,

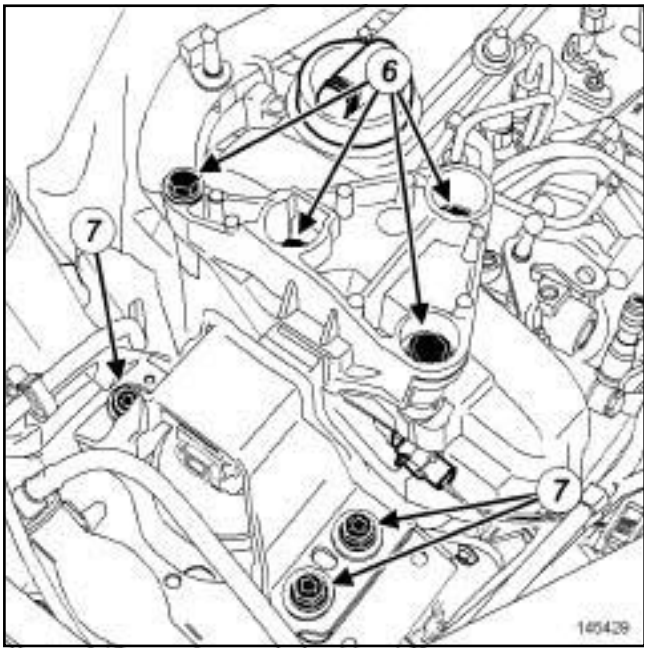
❏ Insert the blanking plugs.

❏ Unclip the fuel pipes at (**2**) ,

❏ Move the fuel pipes aside.

K9K

II - REMOVAL OPERATION



145429

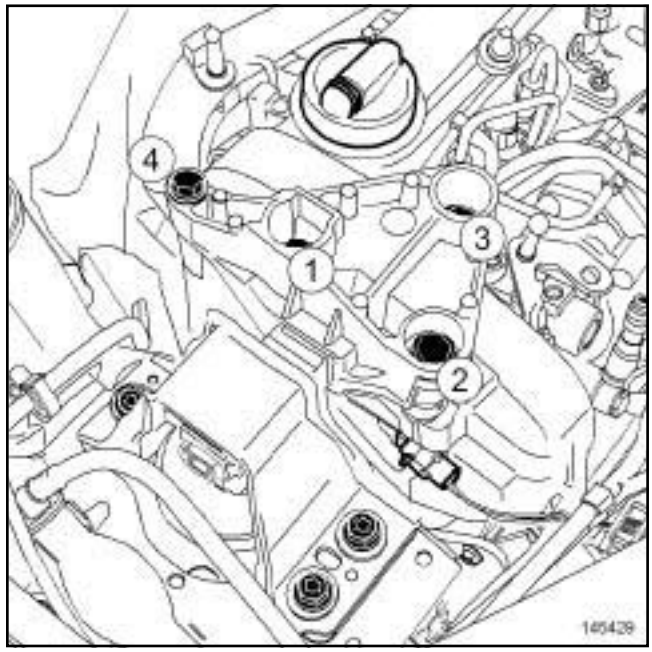
❏ Mark the position of the right-hand suspended engine mounting on the body.

❏ Remove:

- the bolts (**6**) from the right-hand suspended engine mounting on the engine,
- the right-hand suspended engine mounting bolts (**7**) on the body,
- the right-hand suspended engine mounting.

REFITTING

I - REFITTING OPERATION



145429

❏ Refit:

- the right-hand suspended engine mounting observing the marks made on the body during removal,
- the right-hand suspended engine mounting bolts on the engine,
- the right-hand suspended engine mounting bolts on the body.

❏ Torque tighten in order the **right-hand suspended engine mounting bolts on the engine (62 N.m)**.

❏ Torque tighten the **right-hand suspended engine mounting bolts on the body (62 N.m)**.

II - FINAL OPERATION

❏ Position the fuel pipes.

❏ Clip on the fuel pipes at ***(2)*** .

❏ Remove the blanking plugs.

❏ Connect the fuel pipe at ***(1)*** .

❏ Remove the engine support tool **(Mot. 1453)** and the retaining strap.

❏ Refit the engine cover.

K4M

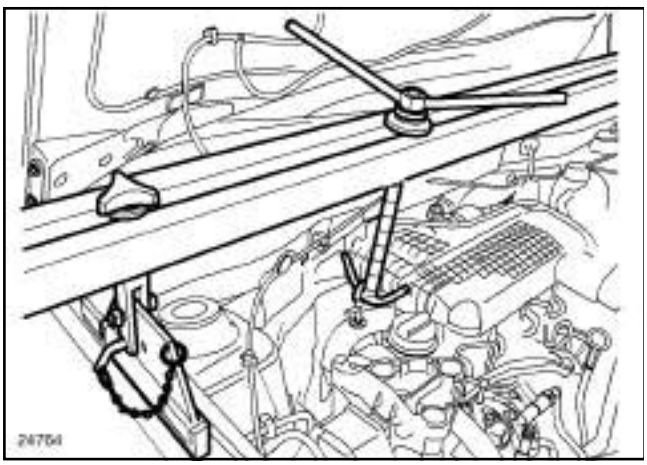
Special tooling required	
Mot. 1453	Engine anchorage support with multiple adjustments and retaining straps.

Tightening torques ▽	
right-hand suspended engine mounting bolts on the engine	**62 N.m**
right-hand suspended engine mounting bolts on the body	**62 N.m**

REMOVAL

I - REMOVAL PREPARATION OPERATION

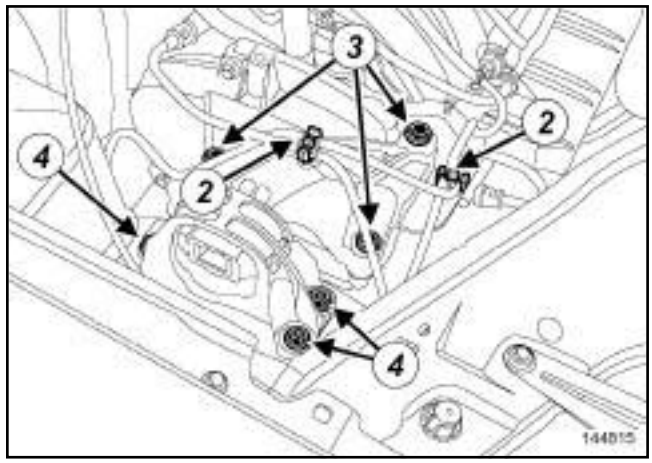
❏ Remove the front engine cover.



24764

❏ Fit the engine support tool **(Mot. 1453)** with the retaining belt, taking the timing end lifting eye as an anchoring point.

II - REMOVAL OPERATION



144815

❏ Detach at (**2**) :

- the fuel supply pipe,
- the petrol vapour recirculation pipe.

❏ Mark the position of the right-hand suspended engine mounting on the body.

❏ Remove:

- the bolts ***(3)*** from the right-hand suspended engine mounting on the engine,
- the right-hand suspended engine mounting bolts ***(4)*** on the body,
- the right-hand suspended engine mounting.

REFITTING

I - REFITTING OPERATION

❏ Refit:

- the right-hand suspended engine mounting observing the marks made on the body during removal,
- the right-hand suspended engine mounting bolts on the engine,
- the right-hand suspended engine mounting bolts on the body.

❏ Torque tighten:

- the **right-hand suspended engine mounting bolts on the engine (62 N.m)**,
- the **right-hand suspended engine mounting bolts on the body (62 N.m)**.

❏ Clip:

- the fuel supply pipe,
- the petrol vapour recirculation pipe.

K4M

II - FINAL OPERATION

❑ Remove the engine support tool **(Mot. 1453)**.

❑ Refit the engine cover.

Tightening torques ▽	
rear suspended engine mounting bolt on the subframe	**105 N.m**
rear suspended engine mounting bolts on the gearbox	**105 N.m**

REMOVAL

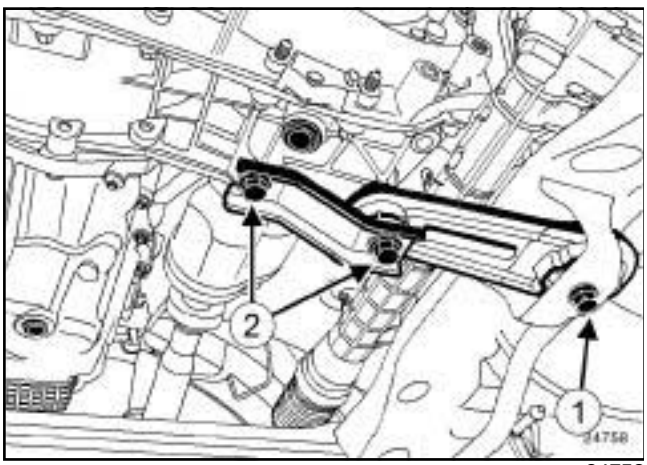
I - REMOVAL PREPARATION OPERATION

❏ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

❏ Remove the engine undertray.

II - REMOVAL OPERATION

JR5



24758

❏ Remove:

- the rear suspended engine mounting bolt (**1**) from the subframe,
- the rear suspended engine bolts (**2**) from the gear-box,
- the rear suspended engine mounting.

REFITTING

I - REFITTING OPERATION

❏ Refit:

- the rear suspended engine mounting,
- the rear suspended engine mounting bolts.

❏ Torque tighten:

- the **rear suspended engine mounting bolt on the subframe (105 N.m)**,
- the **rear suspended engine mounting bolts on the gearbox (105 N.m)**.

II - FINAL OPERATION

❏ Refit the engine undertray.

❏ Tighten the engine undertray bolts.